



AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Approved by A.I.C.T.E., New Delhi & Permanently Affiliated to J.N.T.U-GV, Vizianagaram)

NAAC "B++" Accredited Institute

Cherukupally (Village), Near Tagarapuvalasa Bridge, Vizianagaram (Dist) -531162.

www.aietta.ac.in, principal@aietta.ac.in

Department of Electronics and Communication Engineering

Program: B. Tech – Electronics and Communications Engineering

Regulation: R19

Course Outcomes

No. of Courses: 90

I-I Sem	Course: English
CO-1	understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
CO-2	ask and answer general questions on familiar topics and introduce oneself/others
CO-3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
CO-4	recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
CO-5	Form sentences using proper grammatical structures and correct word forms
I-I Sem	Course: Mathematics-1
CO-1	utilize mean value theorems to real life problems (L3)
CO-2	solve the differential equations related to various engineering fields(L3)
CO-3	familiarize with functions of several variables which is useful in optimization(L3)
CO-4	Apply double integration techniques in evaluating areas bounded by region(L3)
CO-5	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5)
I-I Sem	Course: Applied Chemistry
CO-1	Outline the properties of polymers and various additives added and different methods of forming plastic materials.
CO-2	Explain the preparation, properties and applications of some plastic materials.
CO-3	Interpret the mechanism of conduction in conducting polymers.
CO-4	Discuss natural and synthetic rubbers and their applications.
CO-5	Understand the principles of different analytical instruments.
I-I Sem	Course: Programming for Problem Solving Using C
CO-1	To write algorithms and to draw flowcharts for solving problems
CO-2	To convert flowcharts/algorithms to C Programs, compile and debug programs
CO-3	To use different operators, data types and write programs that use two-way/ multi-way selection



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CO-4	To select the best loop construct for a given problem
CO-5	To design and implement programs to analyze the different pointer applications
I-I Sem Course: Engineering Drawing	
CO-1	The student will learn to use drawing instruments and to draw polygons, Engg. Curves.
CO-2	The student will learn to use orthographic projections, projections of points & simple lines.
CO-3	The student will learn to draw the projections of the plane inclined to both the planes.
CO-4	The student will learn to draw the projections of the various types of solids in different positions inclined to one of the planes.
CO-5	The student will learn to represent the object in 3D view through isometric views.
I-I Sem Course: English Lab	
CO-1	The communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	to assess each learner in the class for not less than 10 speaking activities
CO-3	Student able to learn Weak and Strong forms Stress in compound words
I-I Sem Course: Applied Chemistry Lab	
CO-1	The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators;
CO-2	The experiments introduce EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis.
CO-3	Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
I-I Sem Course: Programming For Problem Solving Using C Lab	
CO-1	Gains Knowledge on various concepts of a C language.
CO-2	Able to draw flowcharts and write algorithms.
CO-3	Able design and development of C problem solving skills.
I-I Sem Course: Environmental Science	



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CO-1	Students will be able to Analyze global environmental changes
CO-2	Students will be able to Analyze Natural Resources
CO-3	Students will be able to Analyze Biodiversity and its conservation
CO-4	Students will be able to Environmental Pollution AND Solid Waste Management
CO-5	Students will be able to Social Issues and the Environment and Environmental Management
I-II Sem	Course: Mathematics-II
CO-1	develop the use of matrix algebra techniques that is needed by engineers for practical applications(L6)
CO-2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel(L3)
CO-3	evaluate approximating the roots of polynomial and transcendental equations by different algorithms(I.5)
CO-4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals(L3)
CO-5	apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations(L3)
I-II Sem	Course: Mathematics - III
CO -1	interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
CO-2	estimate the work done against a field, circulation and flux using vector calculus(L5)
CO-3	apply the Laplace transform for solving differential equations(L3)
CO-4	find or compute the Fourier series of periodic signals(L3)
CO-5	know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms(L3) identify solution methods for partial differential equations that model physical processes (L3)
I-II Sem	Course: Applied Physics
CO -1	Explain the concept of polarization in dielectric materials.
CO -2	Summarize various types of polarization of dielectrics.
CO -3	Interpret Lorentz field and Claussius- Mosotti relation in dielectrics.
CO -4	Classify the magnetic materials based on susceptibility and their temperature dependence.
CO -5	Explain the applications of dielectric and magnetic materials to Apply the concept of magnetism to magnetic devices



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I-II Sem	Course: Network Analysis
CO -1	Gain the knowledge on basic network elements.
CO -2	Will analyze the RLC circuits behavior in detailed.
CO -3	Analyze the performance of periodic waveforms.
CO -4	Gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h &g).
CO -5	Analyze the filter design concepts in real world applications.
I-II Sem	Course: Basic Electrical Engineering
CO -1	Able to explain the operation of DC generator and analyze the characteristics of DC generator.
CO -2	Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the starting and speed control methods of DCmotors.
CO -3	Ability to analyze the performance and speed – torque characteristics of a 3-phase induction motor and understand starting methods of 3-phase inductionmotor.
CO -4	Able to explain the operation of SynchronousMachines
CO -5	Capability to understand the operation of various specialmachines
I-II Sem	Course: Electronic Workshop
CO-1	Able to explain the operation of Identification of components
CO-2	Able to explain the principle of operation of Laboratory equipment
CO-3	Ability to analyze the PCB,CROSoldering practice
I-II Sem	Course: Basic Electrical Engineering Lab
CO -1	Determine and predetermine the performance of DC machines and transformers.
CO -2	Control the DC shunt machines.
CO -3	Compute the performance of 1-phase transformer, 3-phase induction motor and alternator
I-II Sem	Course: Applied Physic Lab
CO -1	Construction and working details of instruments, ie., Interferometer and Diffract meter are learnt.
CO -2	Construction and working details of instrument -Polari meter are learnt.



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CO -3	Study EM-fields and semiconductors under the concepts of Quantum mechanics paves way for their optimal utility.
I-II Sem Course: Communication Skills Lab	
CO -1	A study of the communicative items like JAM, Hypothetical Situations, Self/Peer Profile Common Errors in Pronunciation, Neutralising Accent
CO -2	A study of the communicative items like Telephonic Etiquette, Role Plays Poster Presentations, Oral Presentation skills, Public speaking Data Interpretation
CO -3	A study of the communicative items like Group Discussions: Do's and Don'ts-Types, Modalities Interview Skills: Preparatory Techniques, Frequently asked questions, Mock Interviews.
I-II Sem Course: Engineering Exploration Project	
CO -1	Able to know Build mindsets & foundations essential for designers
CO -2	Able to Learn about the Human-Centered Design methodology and understand their real-world applications
CO -3	Able to learn Design Thinking for problem solving methodology for investigating ill defined problems.
CO -4	Able to know several design challenges and work towards the final design challenge
II-I Sem Course: Electronic Devices And Circuits	
CO -1	Apply the basic concepts of semiconductor physics.
CO -2	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
CO -3	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
CO -4	Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
CO -5	Know the need to Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations
II-I Sem Course: Switching Theory And Logic Design	
CO -1	Classify different number systems and apply to generate various codes.
CO -2	Use the concept of Boolean algebra in minimization of switching functions
CO -3	Design different types of combinational logic circuits.
CO -4	Apply knowledge of flip-flops in designing of Registers and counters
CO -5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines and modifying the traditional design techniques.



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II-I Sem	
Course: Signals And Systems	
CO -1	Differentiate the various classifications of signals and systems
CO -2	Analyze the frequency domain representation of signals using Fourier concepts
CO -3	Classify the systems based on their properties and determine the response of LTI Systems.
CO -4	Know the sampling process and various types of sampling techniques.
CO -5	Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete)
II-I Sem	
Course: Random Variables And Stochastic Processes	
CO -1	Mathematically model the random phenomena and solve simple probabilistic problems.
CO -2	Identify different types of random variables and compute statistical averages of these random variables.
CO -3	Characterize the random processes in the time and frequency domains.
CO-4	Analyze the LTI systems with random inputs
CO-5	Understand the important concepts of random variables and stochastic processes
II-I Sem	
Course: Object Oriented Programming Through Java	
CO-1	Students can able to learn Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.
CO-2	Students can able to learn Inheritance and Polymorphism
CO-3	Students can able to learn Event and GUI programming
CO-4	Students can able to learn I/O programming
CO-5	Students can able to learn Multithreading in java
II-I Sem	
Course: Managerial Economics & Financial Analysis	
CO -1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
CO -2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
CO -3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.



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CO -4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
CO -5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision-making.
II-I Sem Course: Electronic Devices And Circuits Lab	
CO-1	Remember P-N Junction and zene Diode Characteristics
CO-2	Remember Rectifiers (without and with c-filter)
CO-3	Remember BJT ,SCR UJTand FET Characteristics and CRO operation
II-I Sem Course: Switching Theory And Logic Design Lab	
CO-1	Know logic gates, Flipflops
CO-2	Know combinational circuits, multiplexers and de-multiplexers
CO-3	Know decoders and encoders, 7 Segment Display Circuit
II-I Sem Course: Constitution Of India	
CO -1	Understand historical background of the constitution making and its importance for building a democratic India.
CO -2	Understand the functioning of three wings of the government ie.,executive, legislative and judiciary.
CO -3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
CO -4	Analyze the decentralization of power between central, state and local self-government.
CO -5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
II-II Sem Course: Electronic Circuit Analysis	
CO -1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
CO -2	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.
CO -3	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
CO -4	Know the classification of the power and tuned amplifiers and their analysis with performance comparison.
CO -5	Remember the classification of the power and tuned amplifiers and their analysis with performance comparison.



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II-II Sem	Course: Linear Control Systems
CO -1	This course introduces the concepts of feedback and its advantages to various control systems
CO -2	The performance metrics to design the control system in time-domain and frequency domain are introduced.
CO -3	Control systems for various applications can be designed using time-domain and frequency domain analysis.
CO -4	In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.
CO -5	Understand the concepts of state variable analysis, design and also the concepts of controllability and observability.
II-II Sem	Course: Electromagnetic Waves And Transmission Lines
CO -1	Determine E and H using various laws and applications of electric & magnetic fields
CO -2	Apply the Maxwell equations to analyze the time varying behavior of Enweaves
CO -3	Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media
CO -4	Calculate Brewster angle, critical angle and total internal reflection
CO -5	Derive and Calculate the expressions for input impedance of transmission lines ,reflection coefficient, VSWR etc. using smith chart
II-II Sem	Course: Analog Communications
CO -1	Differentiate various Analog modulation and demodulationschemes and their spectralcharacteristics
CO -2	Analyze noise characteristics of various analog modulationmethods
CO -3	Analyze various functional blocks of radio transmitters andreceivers
CO -4	Design simple analog systems for various modulationtechniques.
CO -5	Remember basic techniques for generating and demodulating various pulse modulated signals.
II-II Sem	Course: Computer Architecture And Organization
CO -1	Students can understand the architecture of modern computer.
CO -2	They can analyze the Performance of a computer using performance equation
CO -3	Understanding of different instruction types.
CO -4	Students can calculate the effective address of an operand by addressing modes
CO -5	They can understand how computer stores positive and negative numbers.



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II-II Sem	
Course: Management And Organizational Behavior	
CO -1	After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure.
CO -2	Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments.
CO -3	The learner is able to think in strategically through contemporary management practices.
CO -4	The learner can develop positive attitude through personality development and can equip with motivational theories.
CO -5	The student can attain the group performance and grievance handling in managing the organizational culture
II-II Sem	
Course: Electronic Circuit Analysis Lab	
CO-1	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
CO-2	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.
CO-3	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
II-II Sem	
Course: Analog Communications Lab	
CO-1	Differentiate various Analog modulation and demodulation schemes and their spectral characteristics
CO-2	Analyze noise characteristics of various analog modulation methods
CO-3	Analyze various functional blocks of radio transmitters and receivers
III-I Sem	
Course: Linear Integrated Circuits And Applications	
CO -1	Design circuits using operational amplifiers for various applications.
CO -2	Analyze and design amplifiers and active filters using Op-amp.
CO -3	Diagnose and trouble-shoot linear electronic circuits.
CO -4	Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
CO -5	Understand thoroughly the operational amplifiers with linear integrated circuits.
III-I Sem	
Course: Microprocessor And Microcontrollers	
CO -1	Understand the architecture of microprocessor/ microcontroller and their operation.



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CO -2	Demonstrate programming skills in assembly language for processors and Controllers.
CO -3	Analyze various interfacing techniques and apply them for the design of processor/Controller based systems.
CO -4	Understand the knowledge on interfacing various peripherals, configure and develop programs to interface peripherals/sensors.
CO -5	Understand To develop programs efficiently on ARM Cortex processors and debug.
III-I Sem Course: Digital Communications	
CO -1	Analyze the performance of a Digital Communication System for probability of error and are able to design a digital communication system.
CO -2	Analyze various source coding techniques.
CO -3	Compute and analyze Block codes, cyclic codes and convolution codes.
CO -4	Design a coded communication system.
CO -5	Understanding the concepts of information theory and need for sourcecoding.
III-I Sem Course: Electronic Measurements & Instrumentation	
CO -1	Select the instrument to be used based on the requirements.
CO -2	Understand and analyze different signal generators and analyzers.
CO -3	Understand the design of oscilloscopes for different applications.
CO -4	Design different transducers for measurement of different parameters.
CO -5	Understand the use of various measuring techniques for measurement of different physical parameters using different classes of transducers.
III-I Sem Course: Information Theory & Coding (PE-1)	
CO -1	Design an Application with Error-Control coding
CO -2	Use Compression and Decompression Techniques
CO -3	Perform source coding and channel coding□
CO -4	Understand Compression and Decompression Techniques
CO -5	Understand the Concepts of Multimedia Communication
III-I Sem Course: Digital System Design Using HDL (PE-1)	
CO -1	Understand the architecture of FPGAs, tools used in modelling of digital design
CO -2	Analyze and design basic digital circuits with combinatorial and sequential logic



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	circuits using Verilog HDL.
CO -3	Model complex digital systems at several levels of abstractions.
CO -4	Design real time applications such as vending machine and washing machines etc.
CO -5	Create test benches and create data models to verify bit-true accurate designs.
III-I Sem Course: Data Structures And Algorithms (PE-1)	
CO -1	Demonstrate analytical comprehension of concepts such as abstract data types□
CO -2	Analyze various generic programming techniques,
CO -3	Compare various sorting algorithms and perform their efficiency analysis.
CO -4	Demonstrate the ability to analyze, design, apply and use data structures and algorithms to solve engineering problems and evaluate their solutions.
CO -5	Demonstrate the ability of using generic principles for data representation & manipulation with a view for efficiency, maintainability, and code-reuse.□
III-I Sem Course: Soft Computing Techniques And Python Programming (PE-1)	
CO -1	Understand and comprehend the basics of python programming.
CO -2	Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology.
CO -3	Explain the use of the built-in data structures list, sets, tuples and dictionary.
CO -4	Make use of functions and its applications.
CO -5	Identify real-world applications using oops, files and exception handling provided by python.
III-I Sem Course: Simulation & Mathematical Modeling (PE-1)	
CO -1	Solve real world problems which cannot be solved strictly by mathematical approaches.
CO -2	Understand the principles within mathematic modeling of materials science.
CO -3	Demonstrate the ability describe the mathematical components in mechanical and thermal analyses.
CO -4	Able to describe the conditions in numerical code for solving stress loading problems.
CO -5	Create case studies on City traffic simulation, Indoor air quality simulation of a building, machine health simulation
III-II Sem Course: Linear Integrated Circuits And Applications Lab	



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CO -1	Understand and analyze the IC 741 operational amplifier and its characteristics.
CO -2	Design the solution for linear & non-linear applications using IC741
CO -3	Elucidate and design the active filters and oscillators.
III-II Sem Course: Digital Communications Lab	
CO -1	Able to understand basic theories of Digital communication system in practical.
CO -2	Able to design and implement different modulation and demodulation techniques.
CO -3	Able to analyze digital modulation techniques by using MATLAB tools.
III-II Sem Course: Microprocessor And Microcontrollers Lab	
CO -1	Demonstrate ability to handle arithmetic operations using assembly language programming in TASM and training boards
CO -2	Demonstrate ability to handle logical operations using assembly language programming in TASM
CO -3	Demonstrate ability to handle string instructions using assembly language programming in TASM
III-II Sem Course: Mini Project With Hardware Development	
CO -1	The student may execute the mini project during summer vacation for a period of 6 weeks i.e. between IV and V Semesters. The student shall submit a diary and a technical report for evaluation. Mini Project work may involve carrying out a detailed feasibility study, literature survey along with the implementation results and preparing a work plan for major project
III-II Sem Course: Essence Of Indian Traditional Knowledge	
CO -1	Understand the concept of Traditional knowledge and its importance□
CO -2	Know the need and importance of protecting traditional knowledge□
CO -3	Know the various enactments related to the protection of traditional knowledge□
CO -4	Understand the concepts of Intellectual property to protect the traditional knowledge
CO -5	Understand the concepts of Intellectual property to protect the traditional knowledge
III-II Sem Course: Wired And Wireless Transmission Devices	
CO -1	Identify basic antenna parameters.
CO -2	Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro strip antennas



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CO -3	Quantify the fields radiated by various types of antennas
CO -4	Design and analyze antenna arrays
CO -5	Analyze antenna measurements to assess antenna's performance
III-II Sem Course: Vlsi Design	
CO -1	Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
CO -2	Apply the design Rules and draw layout of a given logic circuit.
CO -3	Design MOSFET based logic circuit.
CO -4	Design basic building blocks in Analog IC design.
CO -5	Analyze the behaviour of amplifier circuits with various loads.
III-II Sem Course: Digital Signal Processing	
CO -1	Formulate engineering problems in terms of DSP operations
CO -2	Analyze digital signals and systems
CO -3	Analyze discrete time signals in frequency domain
CO -4	Design digital filters and implement with different structures
CO -5	Understand the key architectural
III-II Sem Course: Cellular & Mobile Communication (PE-2)	
CO -1	Analyze the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.
CO -2	Understand the frequency management, channel assignment strategies and antennas in cellular systems.
CO -3	Understand the concepts of handoff and architectures of various cellular systems.
CO -4	Understand the concepts of handoff and types of handoffs.
CO -5	Understand the architectures of GSM and 3G cellular systems.
III-II Sem Course: Digital Ic Design (PE-2)	
CO -1	Understand the concepts of MOS Design.
CO -2	Design and analysis of Combinational and Sequential MOS Circuits.
CO -3	Extend the Digital IC Design to Different Applications.



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CO -4	Understand the Concepts of Semiconductor Memories, Flash Memory, RAM array organization
CO -5	Understand the Concepts of Semiconductor Memories, Flash Memory, RAM array organization
III-II Sem Course: Business Intelligence & Analytics (PE-2)	
CO -1	Understand the essentials of data analytics and the corresponding terminologies
CO -2	Determine the relevance of data to business
CO -3	Be familiar with the steps involved in the analytics process
CO -4	Understand and use statistical and graphical analysis to bring insights out from the data
CO -5	Understand and use BI tools to present data in the form of Dashboards and reports
III-II Sem Course: Pattern Recognition (PE-2)	
CO -1	Study the parametric and linear models for classification
CO -2	Design neural network and SVM for classification
CO -3	Develop machine independent and unsupervised learning techniques.
CO -4	Create a variety of pattern recognition algorithms.
CO -5	Apply machine learning concepts in real life problems.
III-II Sem Course: Robotics And Automation (PE-2)	
CO -1	Perform kinematic and dynamic analyses with simulation.
CO -2	Design control laws for a simple robot.
CO -3	Integrate mechanical and electrical hardware for a real prototype of robotic device.
CO -4	Select a robotic system for given industrial application.
CO -5	Understand implementation of AI in robotics
III-II Sem Course: Data Mining (OE1)	
CO -1	Understand Data Mining Principles
CO -2	Identify appropriate data mining algorithms to solve real world problems
CO -3	Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
CO -4	Analyse the data, identify the problems, and choose the relevant models and algorithms to apply.



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CO -5	Evaluate the strengths and weaknesses of various methods and algorithms and to analyze their behaviour.
III-II Sem Course: Power Electronics (OE1)	
CO -1	Explain the characteristics of various power semiconductor devices and understand the gate driver circuits.
CO -2	Explain the operation of single-phase full wave converters and perform harmonic analysis.
CO -3	Explain the operation of three phase full-wave converters and perform harmonic analysis.
CO -4	Analyze the operation of different types of DC-DC converters.
CO -5	Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
III-II Sem Course: Mems And Its Applications (OE1)	
CO -1	Understand the basic overview of MEMS and Microsystems with broad category of MEMS & Micro system applications.
CO -2	Understanding the working principles of Microsystems
CO -3	Understand the Scaling Laws in Miniaturization and Materials for MEMS and Microsystems
CO -4	Understand the Micro system Fabrication Process and Analyze the different Micro manufacturing process and Applications.
CO -5	Study and Analyze the different types of RF switches, Various Switching Mechanism and their applications..
III-II Sem Course: Artificial Neural Networks (OE1)	
CO -1	Survey of attractive applications of Artificial Neural Networks.
CO -2	practically approach for using Artificial Neural Networks in various technical, organizational and economic applications
CO -3	Understand Survey of attractive applications of Artificial Neural Networks.
CO -4	Understand practically approach for using Artificial Neural Networks in various technical, organizational and economic applications
CO -5	Understand Survey of attractive applications of Artificial Neural Networks.
III-II Sem Course: Internet Of Things	
CO -1	Understand internet of Things and its hardware and software components.
CO -2	Interface I/O devices, sensors & communication modules.
CO -3	Remotely monitor data and control devices.



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CO -4	Design real time IoT based applications
CO -5	Understand design principles and capabilities of IoT.
III-II Sem Course: Vlsi Lab	
CO -1	The students are able to develop Verilog /VHDL Source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary Synthesizer.
CO -2	The students are able to implement on the latest FPGA/CPLD Hardware in the Laboratory
CO -3	Understand and implement Back-end Level Design and Implementation
III-II Sem Course: Digital Signal Processing Lab	
CO -1	Create DT, DFT, ZERO PLOT, BODEPLOT, NYQUIST PLOT, FIR, IIR FILTERS USING MAT LAB AND CCS STUDIO.
CO -2	Create DT, DFT, ZERO PLOT, BODEPLOT, NYQUIST PLOT, FIR, IIR FILTERS USING TI DSP Starter Kit
CO -3	Create DT, DFT, ZERO PLOT, BODEPLOT, NYQUIST PLOT, FIR, IIR FILTERS USING Cypress FM4 Starter Kit.
III-II Sem Course: Intellectual Property Rights (IPR) & Patents	
CO -1	IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seek Patents
CO -2	Student get an insight on Copyrights, Patents and Software patents which are instrumental for further advancements
CO -3	advanced Technical and Scientific disciplines
CO -4	Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latest developments
CO -5	Understand insight on Trade Secrets & Cyber Law and Cyber Crime
IV-I Sem Course: Microwave And Optical Communication Engineering	
CO -1	Design different modes in waveguide structures
CO -2	Calculate S-matrix for various waveguide components and splitting the microwave energy in a desired direction
CO -3	Distinguish between Microwave tubes and Solid State Devices, calculation of efficiency devices.
CO -4	Measure various microwave parameters using a Microwave test bench
CO -5	Evaluate various microwave parameters using a Microwave test bench



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IV-I Sem	Course: Data Communications & Computer Networks
CO -1	Know the Categories and functions of various Data communication Networks
CO -2	Design and analyze various error detection techniques.
CO -3	Demonstrate the mechanism of routing the data in network layer
CO -4	Know the significance of various Flow control and Congestion control Mechanisms
CO -5	Know the Functioning of various Application layer Protocols.
IV-I Sem	Course: Digital Image And Video Processing
CO -1	Defining the digital image
CO -2	Know the advantages of representation of digital images in transform domain
CO -3	Know how an image can be enhanced by using histogram techniques
CO -4	Understand image degradation
CO -5	Know the detection of point
IV-I Sem	Course: Communication Standards And Protocols (PE- 3)
CO -1	Able to develop sensor networks
CO -2	Able to communicate data via Wired/Wireless communication
CO -3	Configure and test communication technologies
CO -4	Understand Wired and wireless Communication Protocols
CO -5	Understand Network Types and network securities
IV-I Sem	Course: Analog Ic Design (PE- 3)
CO -1	Model and simulate different MOS Devices using small signal Model.
CO -2	Design and analyze any Analog Circuits in real time applications.
CO -3	Apply the concepts Analog Circuit Design to develop various Applications in Real Time.
CO -4	Analyze and compare different Open-Loop Comparators and Oscillators.
CO -5	Analyze and compare different Open-Loop Comparators and Oscillators.
IV-I Sem	Course: Smart Sensors (PE- 3)
CO -1	Understand measuring parameters, measuring systems, effects of environment,



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	characteristics and parameters to be considered for designing an instrument
CO -2	Understand different types of sensors/transducers, working principles, selection procedure, applications of sensing systems
CO -3	Understand Challenges and applications of sensors and sensor networks
CO -4	Select a sensor/sensing system for a requirement
CO -5	Test, install and collect the data from a group of sensors.
IV-I Sem	Course: Advanced Digital Signal Processing (PE- 3)
CO -1	Comprehend the DFT, FFT and IIR filters.
CO -2	To study the modern digital signal processing algorithms and applications.
CO -3	Have an in-depth knowledge of use of digital systems in real time applications
CO -4	Acquire the basics of multi rate digital signal processing and apply the algorithms for wide area of recent applications.
CO -5	Analyze the power spectrum estimation and Comprehend the Finite word length effects in Fixed point DSP Systems.
IV-I Sem	Course: Augmented Reality (PE- 3)
CO -1	Understand the basics of Augmented Reality
CO -2	Understand human senses and their relationship to devices
CO -3	Understand various application scenarios of AR
CO -4	Understand software architecture
CO -5	Understand Human factors, legal and social considerations
IV-I Sem	Course: Software Radio (PE- 4)
CO -1	Able to analyze the basic components of software defined radio.
CO -2	Demonstrate understanding about distortion parameters and nonlinear Distortion in Transmitted Signals
CO -3	Able to calculate power requirement in power amplifier for SDR
CO -4	Demonstrate understanding about Digital Pre-distortion Techniques for Linear/Nonlinear Distortion
CO -5	Design and analyze the various algorithms used for software defined radio.
IV-I Sem	Course: Low Power Vlsi Design (PE- 4)
CO -1	Understand the need of Low power circuit design.



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CO -2	Attain the knowledge of architectural approaches.
CO -3	Analyze and design Low-Voltage Low-Power combinational circuits.
CO -4	Known the design of Low-Voltage Low-Power Memories
CO -5	Create Low-Voltage Low-Power Memories
IV-I Sem Course: Embedded Systems (PE- 4)	
CO -1	Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function.
CO -2	The hardware components required for an embedded system and the design approach of an embedded hardware.
CO -3	The various embedded firmware design approaches on embedded environment.
CO -4	Understand how to integrate hardware and firmware of an embedded system using real time operating system.
CO -5	Understand the Embedded system implementation and testing tools .
IV-I Sem Course: Dsp Processors And Architectures (PE- 4)	
CO -1	Understand the basic concepts of Digital Signal Processing.
CO -2	To differentiate the architectural features of General purpose processors and DSP processors.
CO -3	Understand the architectures of TMS320C54xx devices and ADSP 2100 DSP devices.
CO -4	Write the simple assembly language programs by using instruction set of TMS320C54xx.
CO -5	To interface the various devices to DSP Processors.
IV-I Sem Course: Multi Media Communication (PE- 4)	
CO -1	Develop the multimedia content using multimedia tools
CO -2	Understand various audio, video and joint coding techniques.
CO -3	Identify the requirements of real time multimedia transfer on IP networks.
CO -4	Study different types of multimedia processors
CO -5	Analyse different network layer based application.
IV-I Sem Course: Internet Of Things Lab	
CO -1	Understand the importance of internet of things in present scenario



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CO -2	Describe the interfacing of IoT with arduino.
CO -3	Design of direct and alternating type of electrical instruments using arduino
IV-I Sem Course: Microwave And Optical Communication Engineering Lab	
CO -1	Verify characteristics of Reflex Klystron.
CO -2	Analyze various parameters of Waveguide Components.
CO -3	Estimate the power measurements of RF Components such as directional Couplers.
IV-II Sem Course: Wireless Communication (PE- 5)	
CO -1	Know about the Wireless systems and Standards (1G/2G/3Gsystems).
CO -2	Concept and analysis of CDMA-based wireless networks.
CO -3	Understand the concepts of Multiple-Input Multiple-Output(MIMO).
CO -4	Understand the modern wireless systems using OFDM.
CO -5	Analysis of Satellite-Based Wireless systems.
IV-II Sem Course: Vlsi Testing & Testability (PE- 5)	
CO -1	Model digital circuits at logic and RTL levels
CO -2	Simulate digital ICs in the presence of faults and evaluate the given test set for fault coverage
CO -3	Generate test patterns for detecting single stuck faults in combinational and sequential circuits
CO -4	Identify schemes for introducing testability into digital circuits with improved fault coverage
CO -5	Compare different approaches for introducing BIST into logic circuits, memories and embedded
IV-II Sem Course: Machine Learning & Artificial Intelligence (PE- 5)	
CO -1	Understand machine learning concepts and range of problems that can be handled by machine learning.
CO -2	Apply the machine learning concepts in real life problems.
CO -3	Understand artificial neural networks concept and apply techniques to train the neural networks
CO -4	Understand how graphical models are used for supervised and unsupervised learning
CO -5	Understand Reinforcement Learning concept and applications



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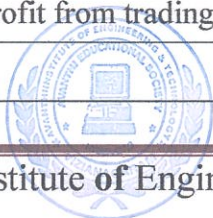
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IV-II Sem	Course: Speech Processing (PE- 5)
CO -1	Summarize the mechanism of human speech production and articulation
CO -2	Identify the time domain speech signal parameters
CO -3	Differentiate time and frequency domain methods of speech processing
CO -4	Attribute linear predictive analysis for speech signals
CO -5	Explain the solutions for LPC equations
IV-II Sem	Course: Industrial Internet Of Things (PE- 5)
CO -1	Understand the elements of IoT to build a total control plane in an Industrial application
CO -2	Apply M2M protocols for development of IoT Applications.
CO -3	Learn and understand the concept of digitalization and data acquisition.
CO -4	Build smart factory based on the IoT concepts
CO -5	Build Industrial Digital Twins.
IV-II Sem	Course: 3D Printing (OE- 5)
CO -1	Identify the importance of RP in present scenario.
CO -2	Gain the knowledge on 3DP
CO -3	Application of 3DP in electronics.
CO -4	Minimize various errors that are occurring during conversion of CAD models.
CO -5	Applications of RP.
IV-II Sem	Course: Block chain Technology (OE- 5)
CO -1	Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.
CO -2	Identify the risks involved in building Block chain applications.
CO -3	Review of legal implications using smart contracts.
CO -4	Choose the present landscape of Block chain implementations and Understand Crypto currency markets
CO -5	Examine how to profit from trading crypto currencies.





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IV-II Sem	Course: Cyber Security & Cryptography (OE- 5)
CO -1	Explain the computer forensics fundamentals.
CO -2	Describe the types of computer forensics technology
CO -3	Analyze various computer forensics systems.
CO -4	Illustrate the methods for data recovery, evidence collection and data seizure.
CO -5	Apply the methods for evidence collection and data seizure.
IV Sem -II PROJECT	
CO-1	Formulate., and apply mathematical, science and engineering principles to solve real time engineering problems
CO-2	Test the existing data, communicate and conduct research on complex problems using modern tools
CO-3	Validate the obtained results on contemporary issues related to society
CO-4	Determine effectively the engineering principles used intheir project individually and as a team as per the norms of engineering practice
CO-5	Structure future work to promote life long learning in the context of technological adaptation.




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