Department of Electronics and Communication Engineering

Program: B.Tech- Electronics and Communication Engineering

Regulation: R16 **Course Outcomes** **No. of Courses: 75**

I-I Sem	Course:English-1
CO-1	Understand the readers to develop their knowledge different fields and serve the society accordingly.
CO-2	Remember to motivate the public to adopt road safety measures.
CO-3	Create awareness in the readers that mass production is ultimately detrimental to biological survival.
CO-4	Understand to choose a source of energy suitable for rural India.
CO-5	Create awareness in the reader as to the usefulness of animals for the human society.
CO-6	Apply in identifying safety measures against different varieties of accidents at home and in the workplace.
I-I Sem	**Course:Mathematics-1**
CO-1	Solve linear differential equations of first, second order.
CO-2	Solve linear differential equations of higher order.
CO-3	Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE.
CO-4	Calculate total derivative, Jocobian and minima of functions of two variables.
CO-5	Solve First order Partial differential equations
CO-6	Solve Higher order Partial differential equations.
I-I Sem	**Course:Mathematics-II**
CO-1	Evaluate Algebraic and Transcendental Equations
CO-2	Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals
CO-3	Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations
CO-4	Apply Functions of a complex variable
CO-5	Evaluate Series Expansion and Complex Integration
CO-6	Evaluate Singularities and Residue Theorem
I-I Sem	**Course:Applied Physics**

CO-1	Construction and working details of Interferometer is learnt
CO-2	Construction and working details of Diffract meter is learnt
CO-3	Construction and working details of Polari meters and Lasers are learnt
CO-4	Study of Electromagnetic fields
CO-5	Study of concepts of Quantum mechanics
CO-6	Study of B and theory of solids and semiconductors
I-I Sem	**Course:Computer Programming**
CO-1	Understand the basic terminology used in computer programming
CO-2	Write, compile and debug programs and Use of different data types in C Language.
CO-3	Create programs involving decision structures and loops
CO-4	Create programs involving functions and Explain the difference between call by value and call by reference
CO-5	Understanding the concepts of Arrays and Strings
CO-6	Understand the dynamics of memory by the use of pointers, use of different data structures and create/update basic data files.
I-I Sem	**Course: Engineering Drawing**
CO-1	Use drawing instruments to draw polygons, Engg. Curves
CO-2	Draw the scales, orthographic projections, projections of points & simple lines.
CO-3	Draw the projections of the lines inclined to both the planes
CO-4	Draw the projections of the plane inclined to both the planes
CO-5	Draw the projections of the various types of solids in differentpositions inclined to one of the planes.
CO-6	Represent the object in 3D view through isometric views and convert the isometric view to orthographic view and vice versa
I-I Sem	**Course: Applied / Engineering Physics Lab**
CO-1	To achieve perfectness in experimental skills and the study of practical applications will bring more confidence and ability to develop and fabricate engineering and technical equipments.
CO-2	The Objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies.
CO-3	Create of circuits using new technology and latest components and to develop practical applications of engineering materials and use of principle in the right way to implement the modern technology.

I-I Sem	**Course: Applied / Engineering Physics Virtual Lab – Assignments**
CO-1	Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.
CO-2	Gain knowledge of new concept in the solution of practical oriented problems and to understand more deep knowledge about the solution to theoretical problems.
CO-3	Understand measurement technology, usage of new instruments and real time applications in engineering studies
I-I Sem	**Course: Engineering Workshop & It Workshop**
CO-1	Common understanding of concepts, patterns of decentralization implementation in Africa
CO-2	Identified opportunities for coordinated policy responses, capacity building and implementation of best practices
CO-3	Identified instruments for improved decentralization to the local level
CO-4	Identified strategies for overcoming constraints to effective decentralization and sustainable management at different levels
I-II Sem	**Course:English -II**
CO-1	The lesson underscores that the ultimate aim of Education is to enhance wisdom.
CO-2	The lesson enables the students to promote peaceful co-existence and universal harmony among people and society.
CO-3	The lesson imparts the students to manage different cultural shocks due to globalization.
CO-4	The theme projects society's need to re examine its traditions when they are outdated.
CO-5	The lesson offers several inputs to protect environment for the sustainability of the future generations.
CO-6	Pupils get inspired by eminent personalities who toiled for the present day advancement of software development.
I-II Sem	**Course:Mathematics-III**
CO-1	Solve simultaneous linear equations numerically using various matrix methods.
CO-2	Determine rank, Eigenvalues and Eigen vectors of a given matrix and solve simultaneous linear equations.
CO-3	Determine double integral over a region and triple integral over a volume.
CO-4	Evaluation of integrals, Beta and Gamma functions
CO-5	Calculate gradient of a scalar function, divergence and curl of a vector function.

CO-6	Determine line, surface and volume integrals. Apply Green, Stokes and Gauss.
I-II Sem	**Course: Applied Chemistry**
CO -1	The advantages and limitations of plastic materials and their use in design would be understood.
CO-2	Fuels which are used commonly and their economics, advantages and limitations are discussed.
CO-3	Reasons for corrosion and some methods of corrosion control would be understood. The students would be now aware of materials like nano materials and fullerenes and their uses.
CO-4	Similarly liquid crystals and superconductors are understood.
CO-5	The importance of green synthesis is well understood and how they are different from conventional methods is also explained.
CO-6	Conductance phenomenon is better understood.
I-II Sem	**Course:Electrical & Mechanical Technology**
CO -1	Analyze the various electrical networks.
CO -2	Understand the operation of DC generator, DC Motor ,3-point starter and Speed control methods.
CO -3	Analyze the performance of transformer.
CO -4	Explain the operation of 3-phase alternator and 3-phase induction motors.
CO -5	Explain the working principle of various measuring instruments.
CO -6	Working of I.C. Engines, Modes of Heat transfer, Power transmission by drives and different manufacturing methods.
I-II Sem	**Course:Environmental Studies**
CO -1	The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources.
CO -2	The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web.
CO -3	The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity.
CO -4	Various attributes of the pollution and their impacts and measures to reduce or control the pollution -along with waste management practices.
CO -5	Social issues both rural and urban environment and the possible means to combat the challenges.
CO -6	The environmental legislations of India and the first global initiatives towards sustainable development.

I-II Sem	**Course:Data Structures**
CO -1	Apply advanced data structure strategies for exploring complex data structures.
CO -2	Implement data structures like stacks, queues.
CO -3	Implement data structures like trees.
CO -4	Implement data structures i.e. lists
CO -5	Implement data structures i.e. graphs
CO -6	Handling with sorting
I-II Sem	**Course:Applied/Engineering Chemistry Laboratory**
CO -1	The students entering into the professional course have practically very little exposure to lab classes.
CO -2	The experiments introduce volumetric analysis; redox titrations with different indicators; 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.
I-II Sem	**Course:English - Communication Skills Lab – 2**
CO -1	A study of the communicative items in the laboratory will help the students become successful in the competitive world.
CO-2	A study of the communicative items in the laboratory will help the students to develop presentation skills
CO-3	A study of the communicative items in the laboratory will help the students to develop interview skills
I-II Sem	**Course:Computer Programming Lab**
CO -1	Apply and practice logical ability to solve the problems.
CO -2	Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
CO -3	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
II-I Sem	**Course:Electronic Devices And Circuits**
CO -1	Understand 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	Create and understand 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	Understand the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
CO -6	Analyze 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	Analyze different number systems and apply to generate various codes.
CO -2	Apply the concept of Boolean algebra in minimization of switching functions
CO -3	Create different types of combinational logic circuits.
CO -4	Apply knowledge of flip-flops in designing of Registers and counters
CO -5	Create methodology for synchronous sequential circuits and algorithmic state machines.
CO -6	Create innovative designs by modifying the traditional design techniques.
II-I Sem	**Course:Signals & Systems**
CO -1	Analyze the signals and systems and principles of vector spaces, Concept of orthgonality.
CO -2	Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
CO -3	Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
CO -4	Understand the relationships among the various representations of LTI systems
CO -5	Understand the Concepts of convolution, correlation, Energy and Power density spectrum and their relationships.
CO -6	Apply z-transform to analyze discrete-time signals and systems.
II-I Sem	**Course:Network Analysis**
CO -1	Understand the concept of basic network elements.
CO -2	Analyze the RLC circuits behavior in detailed.
CO -3	Analyze the performance of periodic waveforms.
CO -4	Remember characteristics of two port network parameters (Z, Y, ABCD, h & g).
CO -5	Analyze the filter design concepts in real world applications.

CO-6	Understand the concept of R-L, R-C,R-L-C, circuits
II-I Sem	**Course:Random Variables & Stochastic Processes**
CO -1	Understand Mathematical model of random phenomena and solve simple probabilistic problems.
CO -2	Analyse different types of random variables and compute statistical averages of these random variables.
CO -3	Analyze the random processes in the time and frequency domains.
CO -4	Analyse the LTI systems with random inputs.
CO -5	Apply these techniques to analyse the systems in the presence of different types of noise.
CO-6	Understand the random signal response of linear systems
II-I Sem	**Course:Managerial Economics And Financial Analysis**
CO -1	Understand the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output- cost relationships and estimation of the least cost combination of inputs.
CO -2	Understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
CO -3	Create Financial Statements and the usage of various accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
CO-4	Understand the Concepts of Business Organization and business circle
CO-5	Understanding the accounting and Financing analysis
CO-6	Understand the concepts of Capital and Capital Budgeting
II-I Sem	**Course:Electronic Devices And Circuits Lab**
CO -1	Analyze and Test R, L, C Components (Color Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
CO -2	Analyze and Test active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
CO -3	Remember Soldering Simple circuits using active and passive components.
II-I Sem	**Course:Networks & Electrical Technology Lab**
CO -1	Analyze RLC circuits and understand resonant frequency and Q-factor.
CO -2	Apply first order RC/RL networks of periodic non- sinusoidal waveforms.

CO -3	Apply network theorems to analyze the electrical network.
II-II Sem	**Course:Electronic Circuit Analysis**
CO -1	Create and analysis of small signal high frequency transistor amplifier using BJT and FET.
CO -2	Create and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT
CO -3	Evaluate the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
CO -4	Remember the classification of the power and tuned amplifiers and their analysis with performance comparison.
CO-5	Understand the Classification of Amplifiers
CO-6	Understand the Concepts of Q factor and cascading of amplifiers
II-II Sem	**Course:Control Systems**
CO -1	Understand the concepts of feedback and its advantages to various control systems
CO -2	Understand the performance metrics to design the control system in time-domain and frequency domain are introduced.
CO -3	Create Control systems for various applications using time-domain and frequency domain analysis.
CO -4	Understand the conventional approach, the state space approach for the analysis of control systems is also introduced.
CO-5	Understand the Preliminary Consideration of Classical Design
CO-6	Understand the concept Variable Analysis and Design
II-II Sem	**Course:EM Waves And Transmission Lines**
CO -1	Evaluate 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 EM waves
CO -3	Understand concept of uniform plane wave concept and characteristics of uniform plane wave in various media.
CO -4	Evaluate Brewster angle, critical angle and total internal reflection.
CO -5	Evaluate the expressions for input impedance of transmission lines.
CO -6	Evaluate reflection coefficient, VSWR etc. using smith chart.
II-II Sem	**Course:Analog Communications**
CO -1	Analyze 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.
CO -4	Create simple analog systems for various modulation techniques.
CO-5	Understand the Concept of Noise
CO-6	Understand the concept of Pulse modulation and Demodulation
II-II Sem	**Course:Pulse And Digital Circuits**
CO -1	Create linear and non-linear wave shaping circuits.
CO -2	Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
CO -3	Create different multivibrators and time base generators.
CO -4	Apply non-sinusoidal signals in many experimental research areas.
CO-5	Understand the Voltage time Base Generators
CO-6	Understand the concepts of logic families and sam
II-II Sem	**Course:Management Science**
CO -1	Understand the concepts of management functions, global leadership and organizational behavior.
CO -2	Understand concepts of functional management project management and strategic management.
CO-3	Understand the concepts of HR Manager and Functions of Marketing
CO-4	Understand the Development of Network
CO-5	Understand the Concept of Corporate planning process and theories of MNCs
CO-6	Understand the Concepts of Contemporary Management Practice
II-II Sem	**Course:Electronic Circuit Analysis Lab**
CO -1	Analyze and design single and multistage amplifiers at low, mid and high frequencies.
CO -2	Creating and analyzing the transistor at high frequencies.
CO -3	Evaluate efficiencies of power amplifiers.
II-II Sem	**Course:Analog Communications Lab**

CO -1	Remember different analog modulation techniques.
CO -2	Analyse AM radio receiver
CO -3	Apply the any AM techniques in MATLAB Simulink
III-I Sem	**Course:Computer Architecture And Organization**
CO -1	Understand the architecture of modern computer.
CO -2	Analyze the Performance of a computer using performance equation
CO -3	Understand different instruction types.
CO -4	Evaluate the effective address of an operand by addressing modes
CO -5	Understand how computer stores positive and negative numbers.
CO -6	Understand of how a computer performs arithmetic operation of positive and negative numbers
III-I Sem	**Course:Linear IC Applications**
CO -1	Create circuits using operational amplifiers for various applications.
CO -2	Analyze and design amplifiers and active filters using Op-amp.
CO -3	Evaluate 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.
CO-6	Understand DAC Techniques and ADC Specifications
III-I Sem	**Course:Digital Communications**
CO -1	Evaluate the performance of different waveform coding techniques for the generation and digital representation of the signals.
CO -2	Evaluate the probability of error for various digital modulation schemes
CO -3	Analyze different source coding techniques
CO -4	Analyze different error control coding schemes for the reliable transmission of digital information over the channel.
CO-5	Understand the Shannon's theorem Shannon-Fano coding Huffman coding
CO-6	Understand the linear block and Convolution codes
III-I Sem	**Course:Antenna And Wave Propagation**

CO -1	Analyze basic antenna parameters.
CO -2	Create and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and microstrip antennas.
CO -3	Analyze the fields radiated by various types of antennas.
CO -4	Create and analyze antenna arrays.
CO -5	Analyze antenna measurements to assess antenna's performance.
CO -6	Analyze the characteristics of radio wave propagation.
III-I Sem	**Course:Pulse & Digital Circuits Lab**
CO -1	Create sinusoidal and non-sinusoidal signals
CO -2	Understand basic logic gates and can design applications
CO 3	Analyze various multi vibrator circuits
III-I Sem	**Course: LIC Applications Lab**
CO -1	Understand the concept of operational amplifier (741) .
CO -2	Create circuits using operational amplifiers for various applications.
CO -3	Create various circuits using various linear Digital Integrated IC's.
III-I Sem	**Course:DICA Laboratory**
CO -1	Apply a digital design in a configurable digital circuit with computer supported aid tools.
CO -2	Apply methods for analysis and synthesis of combinational and sequential circuits.
CO -3	Create the high-level programming (HDL programming) skills for digital circuits.
III-I Sem	**Course:Professional Ethicsand Human Values**
CO -1	Understand various issues that are encountered by every professional in discharging professional duties.
CO -2	Understand sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.
CO-3	Evaluate what makes a particular course of action ethically defensible
CO-4	Evaluate their own ethical values and the social context of problems
CO-5	Analyze ethical concerns in research and intellectual contexts
CO-6	Understand ethical values in non-classroom activities

III-II Sem	**Course:Microprocessors And Microcontrollers**
CO -1	Understand the architecture of microprocessor/ microcontroller and their operation.
CO -2	Apply 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 Programming concepts memory organization
CO-5	Understand the Interfacing, 7 segment Display unit A/D D/A converters
CO-6	Understand the pic microcontroller
III-II Sem	**Course:Microwave Engineering**
CO -1	Create different modes in waveguide structures
CO -2	Evaluate S-matrix for various waveguide components and splitting the microwave energy in a desired direction
CO -3	Analyze Microwave tubes and Solid-State Devices, calculation of efficiency of devices.
CO -4	Evaluate various microwave parameters using a Microwave test bench
CO-5	Understand the Waveguide components and applications
CO-6	Understand the Microwave solid state devices
III-II Sem	**Course:Vlsi Design**
CO -1	Understand the properties of MOS active devices and simple circuits configured when using them and the reason for such encumbrances as ratio rules by which circuits can be interconnected in silicon.
CO -2	Remember three sets of Create rules with which NMOS and CMOS designs may be fabricated.
CO -3	Understand the scaling factors determining the characteristics and performance of MOS circuits in silicon.
CO-4	Understand the chip input and output and Design for testability
CO-5	Understand the FPGA Design architecture
CO-6	Understand the Low power VLSI Design.
III-II Sem	**Course:Digital Signal Processing**
CO -1	Apply the difference equations concept in the analyzation of Discrete time systems
CO -2	Apply the FFT algorithm for solving the DFT of a given signal

CO -3	Create a Digital filter (FIR&IIR) from the given specifications
CO -4	Apply FIR and IIR structures from the designed digital filter.
CO -5	Apply the Multirate Processing concepts in various applications (eg: Design of phase shifters, Interfacing of digital systems…)
CO -6	Apply the signal processing concepts on DSP Processor.
III-II Sem	**Course:Oops Through Java(OE)**
CO -1	Understand Java programming concepts and utilize Java Graphical User Interface
CO -2	Remember the Syntax of programs
CO -3	Remember, compile, execute and troubleshoot Java programming for networking concepts.
CO -4	Create Java Application for distributed environment.
CO -5	Create and develop multi-tier applications.
CO-6	Understand the Sample Applet Program Event Handling
III-II Sem	**Course:Data Mining (OE)**
CO -1	Understand stages in building a Data Warehouse
CO -2	Understand the need and importance of preprocessing techniques
CO -3	Understand the need and importance of Similarity and dissimilarity techniques
CO -4	Analyze and evaluate performance of algorithms for Association Rules.
CO -5	Analyze Classification and Clustering algorithms
CO-6	Understand the Cluster Analysis and Different types of Clusters.
III-II Sem	**Course:Industrial Robotics (OE)**
CO -1	Analyze various robot configuration and components,
CO -2	Evaluate appropriate actuators and sensors for a robot based on specific application
CO -3	Analyze kinematic and dynamic analysis for simple serial kinematic chains
CO -4	Apply trajectory planning for a manipulator by avoiding obstacles.
CO-5	Apply the Robot programming and Trajectory planning and avoidance
CO-6	Understand Robot Applications in Manufacturing

III-II Sem	**Course:Power Electronics (OE)**
CO -1	Understand the characteristics of various power semiconductor devices and analyse the static and dynamic characteristics of SCR's.
CO -2	Create firing circuits for SCR.
CO -3	Analyze the operation of single phase half wave and full–wave converters
CO -4	Analyze the operation of different types of DC-DC converters.
CO -5	Understand the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.
CO -6	Analyze the operation of AC-AC converters.
III-II Sem	**Course:Bio-Medical Engineering (OE)**
CO -1	Understand the concept of biomedical instrumentation
CO -2	Understand the concepts of electrodes and transducers
CO -3	Understand the concepts of cardiovascular system and measurements
CO -4	Understand about patient care and monitoring
CO -5	Understand the diagnostic techniques and bio-telemetry
CO -6	Understand the concepts of monitors, recorders and shock hazards
III-II Sem	**Course:Artificial Neural Networks (OE)**
CO -1	Understand the concept of Artificial Neural Networks and Learning Rules and Learning methods
CO -2	Understand the concepts of Feed forward and Feedback Neural Networks
CO -3	Remember Applications of Neural Networks in different areas
CO-4	Understand the feature Mapping Network
CO-5	Understand the Associative memories ART Pattern visibility
CO-6	Understand the applications of image processings.
III-II Sem	**Course:Microprocessors And Microcontrollers Lab**
CO -1	Apply arithmetic operations using assembly language programming in TASM and training boards
CO -2	Apply logical operations using assembly language programming in TASM
CO -3	Apply string instructions using assembly language programming in TASM

III-II Sem	**Course:Vlsi Laboratory**
CO -1	Create CMOS logic circuits.
CO -2	Analyze circuits within a CAD tool and compare to design specifications.
CO -3	Create, implement, and simulate circuits using VHDL.
III-II Sem	**Course:Digital Communications Lab**
CO -1	Understand basic theories of Digital communication system in practical.
CO -2	Create and implement different modulation and demodulation techniques.
CO -3	Analyze digital modulation techniques by using MATLAB tools.
III-II Sem	**Course:Intellectual Property Rights And Patents**
CO -1	Distinguish and explain various forms of IPRs.
CO -2	Analyze criteria to fit one's own intellectual work in particular form of IPRs.
CO -3	Apply statutory provisions to protect particular form of IPRs.
CO -4	Analyze rights and responsibilities of holder of Patent, Copyright, Trademark, Industrial Designetc.
CO -5	Analyze procedure to protect different forms of IPRs national and international level.
CO -6	Create making search using modern tools and technics.
IV-I Sem	**Course:Radar Systems**
CO -1	Evaluate the radar range equation and to solve some analytical problems.
CO -2	Understand the different types of radars and its applications.
CO -3	Understand the concept of tracking and different tracking techniques.
CO -4	Understand the various components of radar receiver and its performance.
CO-5	Under stand the Matched filter and Cross-correlation, Noise Figure and Noise Temperature
CO-6	Understand the Radiation Pattern and Beam width changes.
IV-I Sem	**Course:Digital Image Processing**
CO -1	Apply image manipulations and different digital image processing techniques
CO -2	Apply basic operations like – Enhancement, segmentation, compression,Image transforms and restoration techniques on image.

CO -3	Analyze pseudo and fullcolor image processing techniques.
CO -4	Apply various morphological operators on images
CO-5	Understand the basic morphological algorithms for boundary extraction
CO-6	Understand the basic full color image processing, smoothing and shapping
IV-I Sem	**Course:Computer Networks**
CO -1	Understand OSI and TCP/IP models
CO -2	Analyze MAC layer protocols and LAN technologies
CO -3	Create applications using internet protocols
CO -4	Understand routing and congestion control algorithms
CO -5	Understand how internet works
CO-6	Understand Architecture and Services Message Transfer
IV-I Sem	**Course:Optical Communications**
CO -1	Evaluate necessary components required in modern optical communications systems.
CO -2	Create and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.
CO -3	Apply different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.
CO -4	Evaluate the optical cables for better communication with minimum losses
CO-5	Create, build, and demonstrate optical fiber experiments in the laboratory.
CO-6	Understand the point to point links Measurement of Attenuation and Dispersion, Eye pattern
IV-I Sem	**Course:Television Engineering (E- I)**
CO -1	Understand Fundamentals of Television, Monochrome TV transmitter and receiver, Camera tubes and colour TV display tubes, Colour TV systems and advanced colour TV systems.
CO -2	Analyze the elements of Television, Monochrome TV transmitter and receiver, Camera tubes and colour TV display tubes, Colour TV systems and advanced colour TV systems.
CO -3	Apply the essentials of colour TV and various colour TV systems.
CO -4	Understand fundamentals of television, Monochrome TV transmitter and receiver, Camera tubes and colour TV display tubes, Colour TV systems and advanced colour

	TV systems.
CO -5	Understand different display tubes and various colour TV systems.
CO-6	Understand Technology and Standards Development
IV-I Sem	**Course:Electronic Switching Systems (E- I)**
CO -1	Evaluate the time and space parameters of a switched signal
CO -2	Analyze the digital signal path in time and space, between two terminals
CO -3	Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions.
CO -4	Analyze the traffic capacity of the system.
CO -5	Evaluate methods of collecting traffic data.
CO -6	Evaluate the method of interconnecting two separate digital switches.
IV-I Sem	**Course: System Design Through Verilog (E- I)**
CO -1	Understand Verilog language constructs and conventions
CO -2	Understand know gate level modelling
CO -3	Understand behavioural modelling
CO -4	Understand dataflow level and switch level modelling
CO -5	Understand synthesis of combinational and sequential logic using Verilog
CO -6	Understand Verilog models
IV-I Sem	**Course: Embedded Systems (E- II)**
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	Remember hardware components required for an embedded system and the design approach of an embedded hardware.
CO -3	Understand 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 integrated development environment and debugging.
CO-6	Understand how to CAD and Tools quality assurance and testing of the design.

IV-I Sem	Course: Analog Ic Design (E- II)
CO -1	Understand the concepts of MOS Devices and Modeling.
CO -2	Create and analyze any Analog Circuits in real time applications.
CO -3	Evaluate the Analog Circuit Design to Different Applications in Real Time.
CO -4	Understand of Open-Loop Comparators and Different Types of Oscillators.
CO-5	Understand the two stage, open-loop Comparators, Discrete-Time Comparators.
CO-6	Understand the ring Oscillators, LC Oscillators
IV-I Sem	**Course: Network Security And Cryptography (E- II)**
CO -1	Understand information security awareness and a clear understanding of its importance.
CO -2	Understand master fundamentals of secret and public cryptography
CO -3	Understand master protocols for security services
CO -4	Understand network security threats and countermeasures
CO -5	Create network security designs using available secure solutions (such as PGP)
CO-6	Understand SSL, IPsec, etc.
IV-I Sem	**Course: Microwave Engineering & Optical Lab**
CO -1	Understand characteristics of Reflex Klystron.
CO -2	Analyze various parameters of Waveguide Components.
CO -3	Analyze the power measurements of RF Components such as directional Couplers.
IV-I Sem	**Course: Digital Signal Processing Laboratory**
CO -1	Understand concepts of DSP and its applications usingMATLABSoftware
CO -2	Understand about the basic signal generation
CO -3	Understand Fourier, Transform Concepts
IV-II Sem	**Course: Cellular And Mobile Communications**
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 Sum Different pattern and their Synthesis and high gain antennas
CO-5	Understand the concept of Dropped call rate and evaluation
CO-6	Understand the concepts of GSM architecture
IV-II Sem	**Course: Electronic Measurements And Instrumentation**
CO -1	Remember 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	Create different transducers for measurement of different parameters.
CO-5	Understand the design of Strain gauges, LVDT, Thermocouples.
CO-6	Understand the pressure, Velocity, Humidity, and Dat5a acquisition systems
IV-II Sem	**Course:Satellite Communications**
CO -1	Understand the concepts, applications and subsystems of Satellite communications.
CO -2	Evaluate the expression for G/T ratio and to solve some analytical problems on satellite link design.
CO -3	Understand the various types of multiple access techniques and architecture of earth station design.
CO -4	Understand the concepts of GPS and its architecture.
CO-5	Understand the concepts Earth Station and Technology and NGSO constellation Designs
CO-6	Understand the concepts of Global Position System
IV-II Sem	**Course:Wireless Sensors And Networks (E-III)**
CO -1	Understand challenges and technologies for wireless networks
CO -2	Understand architecture and sensors
CO -3	Remember the communication, energy efficiency, computing, storage and transmission
CO -4	Apply infrastructure and simulations
CO -5	Understand the concept of programming the in WSN environment
CO-6	Understand the concept of Sensor Network Platforms And Tools

IV-II Sem	**Course:Digital Ic Design (E-III)**
CO -1	Understand the concepts of MOS Design.
CO -2	Create and analysis of Combinational and Sequential MOS Circuits.
CO -3	Create the Digital IC Design to Different Applications.
CO -4	Understand the Concepts of Semiconductor Memories, Flash Memory, RAM array organization.
CO-5	Understand the concepts of Advanced Interconnect Techniques
CO-6	Understand the concepts of DRAM and and SRAM
IV-II Sem	**Course: Operating Systems (E-III)**
CO -1	Create various Scheduling algorithms.
CO -2	Apply the principles of concurrency.
CO -3	Create deadlock, prevention and avoidance algorithms.
CO -4	Analyze various memory management schemes.
CO -5	Create and implement a prototype file system.
CO -6	Apply administrative tasks on Linux Servers
IV Sem -II	**Course: 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 contemprory issues related to society and environment
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.

Principal
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