Anurag Engineering College
(Autonomous)
Ananthagiri (V&M), Kodad, Suryapet (Dt). Pin 508 206

B.TECH.

ELECTRONICS AND COMMUNICATION ENGINEERING

R18 REGULATION

COURSE OUTCOMES

I YEAR I SEMESTER

(MA101BS) MATHEMATICS – I
Linear Algebra and Calculus

CO 1:   Write the matrix representation of system of linear equations and identify the consistency of the system of equations.

CO 2:   Find the Eigen values and Eigen vectors of the matrix and discuss the nature of the quadratic form.

CO 3:   Analyze the convergence of sequence and series.

CO 4:   Discuss the applications of mean value theorems to the mathematical problems, evaluation of improper integrals using Beta and Gamma functions.

CO 5:   Find the extreme values of functions of two variables with / without constraints.

(AP102BS) APPLIED PHYSICS

CO 1:   The student would be able to learn the fundamental concepts on Quantum behavior of   matter in its micro state.

CO 2:   The knowledge of fundamentals of Band theory, free electron theory, Wave optics enable the students to apply to various engineering applications.

CO 3:   design, characterization and study of properties of Semiconducting materials and Lasers, Fiber Optics help the students to prepare new materials for various engineering   applications.

(EE103ES) BASIC ELECTRICAL ENGINEERING

CO 1:   Understand the importance of DC circuits and analyze theorems.

CO 2:   Understand the concept of AC circuits and resonance.

CO 3:   Concept of Magnetic Circuits and Determine the losses and efficiency of single phase transformers.

CO 4:   Analyze the performance of DC machines and Induction motors.

CO 5:   Demonstrate the principle of operation of Synchronous generator and importance of Electrical installations.

(CS104ES) PROGRAMMING FOR PROBLEM SOLVING – I

CO 1:   Design algorithms and flowcharts for real world applications

CO 2:   Know the usage of various operators in Program development

CO 3:   Design programs involving decision and iteration structures.

CO 4:   Apply the concepts code reusability using Functions

CO 5:   Analyse the concepts of Arrays and Strings for real world problems.

(ME105ES) ENGINEERING GRAPHICS

CO 1:   Understand engineering drawing and its place in society.

CO 2:   Visualize the different aspects of Points, Lines and Planes.

CO 3:   Acquire knowledge on projections of solids.

CO 4:   Draw sections of solids and plan the drawing for development of surfaces.

CO 5: Understand the isometric views and projections. Exposure to computer-aided geometric design and creating working drawings.

(EN106HS) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB-I
CO 1: Understand the importance of phonetics.
CO 2: Understand the variants in Pronunciation.
CO 3: Differentiate formal and informal English in different situations.
CO 4: Understand the Intonation of English Language in the global world.
CO 5: Participate in Mock Interviews.

(CS107ES) PROGRAMMING FOR PROBLEM SOLVING LAB – I
CO 1: Formulate the algorithms and flowcharts for simple problems.
CO 2: Apply fundamental programming concepts, to solve simple problems
CO 3: Enhance debugging skills.
CO 4: Exercise conditional and iterative statements to Write C programs.
CO 5: Modularize the code with functions so that they can be reused.
CO 6: Represent and manipulate data with arrays and strings.

(AP108BS) APPLIED PHYSICS LAB
CO 1: Apply the various procedures and techniques for the experiments.
CO 2: Use the different measuring devices and meters to record the data with precision
CO 3: Test optical components using principles of interference and diffraction of light.
CO 4: Apply the mathematical concepts/equations to obtain quantitative results.
CO 5: Develop the basic communication through working in the groups and performing the laboratory experiments and by interpreting the results.

(EE109ES) BASIC ELECTRICAL ENGINEERING LAB
CO 1: Verify the various electrical laws and theorems with DC Excitation.
CO 2: Determine the losses, efficiency and regulation of single phase transformer.
CO 3: Obtain the performance of induction motors.
CO 4: Control the speed of DC shunt motor.
CO 5: Obtain the OC & SC characteristics of Synchronous generator.

I YEAR II SEMESTER

(MA201BS) MATHEMATICS – II
CO 1: Classify the various types of differential equations of first order and first degree and apply the concepts of differential equations to the real world problems.
CO 2: Solve higher order differential equations and apply the concepts of differential equations to the real world problems.
CO 3: Evaluate the multiple integrals.
CO 4: Identify the vector differential operators physically in engineering problems.

CO 5: Evaluate the line, surface and volume integrals and converting them from one to another by using vector integral theorems.

(CH202BS) ENGINEERING CHEMISTRY

CO 1: Apply the knowledge of atomic, molecular and electronic changes related to conductivity.
CO 2: Analyze the troubles caused by impure water and method of purification of water.
CO 3: Apply the knowledge of electrode potentials for the protection of metals from corrosion.
CO 4: Explain the concept of configurational and conformational analysis of molecules and reaction mechanism.
CO 5: Apply the knowledge of polymers in every day's life.

(EN203HS) ENGLISH

CO 1: Get inspiration and motivation from Dr. C.V. Raman.
CO 2: Understanding ancient architecture of India.
CO 3: Know about invention of Blue Jeans.
CO 4: Learn what type of diet to take and maintain good health.
CO 5: Understand the result of hard work and confidence.

(CS204ES) PROGRAMMING FOR PROBLEM SOLVING – II

CO 1: Develop programs with user defined data types.
CO 2: Use dynamic memory allocation functions with pointers.
CO 3: Apply various file handling techniques for better data management.
CO 4: Distinguish between stacks and queues.
CO 5: Analyze various dynamic data structures.

(CH205BS) ENGINEERING CHEMISTRY LAB

CO 1: Determination of parameters like hardness and alkalinity of water.
CO 2: Estimation of rate constant of a reaction from concentration – time relationships.
CO 3: Determination of physical properties like surface tension and viscosity.
CO 4: Calculation of strength of compound using instrumentation techniques.
CO 5: To impart fundamental knowledge in handling the equipment/glassware and chemicals in the chemistry laboratory

(ME206ES) ENGINEERING WORKSHOP

CO 1: Practice on manufacturing of components using workshop trades including Carpentry, Fitting, Tin-Smithy, Foundry, Welding Practice, House wiring and Black Smithy.
CO 2: Apply basic electrical engineering knowledge for house wiring practice.
CO 3: Identify and apply suitable tools for different trades of Engineering processes including Material removing, measuring and chiseling.
CO 4: Study and practice on Plumbing, Machine tools, Power tools, Wood working, Plastic Mounding and their operations.

(CS207ES) PROGRAMMING FOR PROBLEM SOLVING LAB – II

CO 1:   Develop applications on user defined data types
CO 2:   Apply dynamic memory allocation through pointers
CO 3:   Use different data structures for create/update basic data files
CO 4:   Implement linear data structures through stacks and queues
CO 5:   Implement various searching and sorting techniques, Linked lists.

(EN208HS) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB – II
CO 1:   Understand the variants in Pronunciation.
CO 2:   Differentiate Spoken and Written English in formal and informal situations.
CO 3:   Understand the emphasis on Pronunciation of English Language in the global world.
CO 4:   Apply strategies for Effective Communication in different situations.
CO 5:   Participate in conversation, Public Speaking and Group Discussion.

II YEAR I SEMESTER

(MA301BS)MATHEMATICS-II
CO 1:   Use Laplace transforms techniques for solving DE's.
CO 2:   Expand given function as a Fourier series.
CO 3:   Apply Fourier transforms.
CO 4:   Evaluate the solution of Algebraic and Transcendental Equations and apply the concept of interpolation to find the values of the function.
CO 5:   Evaluate numerical integrals and evaluate Numerical solution of Ordinary Differential Equations.

(ES302BS) ENVIRONMENTAL SCIENCE
CO 1:   The multidisciplinary nature of environment, essence of environment, biodiversity and its Conservation
CO 2:   About the natural resources and their protection
CO 3:   About the causes and effects of environmental pollution as well as environmental issues
CO 4:   About the management of environmental wastes, disasters and rules, regulations, policies   for the protection of environment
CO 5:   About the natural functioning of ecosystem

(EC303ES) ELECTRONIC DEVICES AND CIRCUITS
CO 1:   Recognize the transport phenomena of charge carriers in a semiconductor.
CO 2:   Analyze the different types of diodes, operation and its characteristics.
CO 3:   Describe Bipolar Junction Transistors and Field Effect Transistors..
CO 4:   Analyze the different biasing techniques used in BJTs and FETs.
CO 5:   Understand the concept of feedback amplifiers and types feedback

(EC304PC)PROBABILITY THEORY & STOCHASTIC PROCESSES
CO 1:   Defining various probability functions.
CO 2:   Gain advanced and integrated understanding of the fundamentals and interrelationship between discrete and continuous random variables.

CO 3: Compute mean and variance for linear functions of two or more random variables.
CO 4: Apply the specialized knowledge in random processes to solve practical engineering problems.
CO 5: Compute and understand the concepts of noise and spectral characteristics of random signals

(EC305PC) SIGNALS & SYSTEMS

CO 1: Distinguish different signals, systems and their time and frequency domain analysis.
CO 2: Understand the significance of FT and sampling types.
CO 3: Identify the conditions for transmission of signals through systems and physical realization of systems.
CO 4: Identify the significance of convolution & correlation functions and their relation
CO 5: Identify the significance of LT, ZT and their relation.

(EC306PC)SWITCHING THEORY AND LOGIC DESIGN

CO 1: Understand numeric information in different forms, e.g. different bases, signed integers, various course such as ASCII, gray and BCD..
CO 2: Postulates of Boolean algebra and to minimize combinational functions..
CO 3: Design and analyze combinational and sequential circuits.
CO 4: Design and application of synchronous state machines using flip-flops.
CO 5: Understand the concepts of FSM and ASM charts.

(EC307ES)ELECTRONIC DEVICES AND CIRCUITS LAB

CO 1: Analyze the characteristics of different electronic devices such as Diodes and Transistors.
CO 2: Understand frequency response of amplifiers.
CO 3: Operate simple circuits like Rectifiers.

(EC308PC) BASIC SIMULATION LAB

CO 1: Understand and generate different signals and perform operations on them.
CO 2: Apply the properties like convolution and correlation on signals using transforms.
CO 3: Find transforms of different signals and locate poles and Zeros.

(HS309MC) GENDER SENSITIZATION
(MANDATORY COURSE)

CO 1: Students will have developed a better understanding of important issues related to gender in contemporary India.
CO 2: Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of   materials derived from research, facts, everyday life, literature and film.
CO 3: Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.

CO 4:   Students will acquire insight into the gendered division of labour and its relation to politics and economy.
CO 5:   Men and women students and professionals will be better equipped to work and live   together as equals.

II YEAR II SEMESTER

(MA401BS) MATHEMATICS-IV
CO 1:   Analyze the complex functions with reference to their analyticity.
CO 2:   Evaluate integration using Cauchy's integral theorem
CO 3:   Find the Taylor's and Laurent's series expansion of complex functions.
CO 4:   Evaluation of integrals using Residue theorem.
CO 5:   Identify the transformations like translation, magnification, rotation and reflection and inversion. Transform a given function from z - plane to w – plane.

(EE306PC/EE402PC) CONTROL SYSTEMS
CO 1:   The basic concepts of control systems, transfer function representation and time response   analysis.
CO 2:   Stability analysis of control systems in time domain and frequency response analysis.
CO 3:   Stability analysis of control systems in frequency domain, classical control design   techniques and state space analysis.

(EC403PC) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES
CO 1:   Get the knowledge of Basic Laws, Concepts and proofs related to Electrostatic Fields and Magneto static Fields.
CO 2:   Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions.
CO 3:   Analyze the Wave Equations for good conductors, good dielectrics and evaluate the UPW Characteristics for several practical media of interest.
CO 4:   Analyze the transmission line parameters and configurations.

(EC404PC)ELECTRONIC CIRCUITS & ANALYSIS
CO 1:   Design the single stage amplifiers.
CO 2:   Understand the concepts of High Frequency Analysis of transistors.
CO 3:   Design the multistage amplifiers
CO 4:   Understand and design the power amplifiers
CO 5:   Design tuned amplifiers useable for audio and Radio applications.

(EC405PC)ANALOG COMMUNICATIONS
CO 1:   Analyze and design of various continuous wave and angle modulation and demodulation techniques.
CO 2:   Understand the effect of noise present in continuous wave and angle modulation techniques.
CO 3:   Apply the knowledge about AM , FM Transmitters and Receivers.

CO 4:   Analyze different Receiver Models in Analog Modulation and Compare different Figure of Merits.

(EC406PC)PULSE AND DIGITAL CIRCUITS

CO 1:   Understand the applications of diode as integrator. differentiator , clipper ,clamper circuits
CO 2:   Learn various switching devices such as diode , transistor
CO 3:   Design of triggering circuit for specific application
CO 4:   Difference between logic gates ,sampling gates

(EC407PC)ANALOG COMMUNICATIONS LAB

CO 1:   Analyze the practical aspects of various analog modulation schemes.
CO 2:   Evaluate the various measures that improve receiver performance.
CO 3:   Apply the programming aspects of MATLAB in simulating various analog modulation techniques .

(EC408PC) ELECTRONIC & PULSE CIRCUITS LAB

CO 1:   Understand amplifiers frequency response
CO 2:   Design power amplifiers and Analyze different Analog amplifier circuits
CO 3:   Design oscillators and multivibrators and synthesize numerous non-sinusoidal waveform   generators.
CO 4:   Analyze the response of linear and nonlinear wave shaping circuits.

(HS409MC)HUMAN VALUES AND PROFESSIONAL ETHICS
(MANDATORY COURSE)

CO 1:   Learns about dilemmas and moral issues and be able to apply these concepts to solve various professional problems
CO 2:   Acquires and understanding of the basic concepts of Professional ethics and human values &also gain the practical implication of ethical theories.
CO 3:   Knows the duties and responsibilities towards the society being in engineering profession.
CO 4:   Students gain the practical implication of evacuation from risk and maintaining confidentiality.
CO 5:   Meets the global challenges and develop the skills to sustaining in competitive environment

III YEAR I SEMESTER

(EC501PC) ANTENNAS AND WAVE PROPAGATION

CO 1:   To list the basics of antennas and various parameters of antenna
CO 2:   To explain the concepts of different types of arrays
CO 3:   To summarize antennas operated in VHF & UHF ranges
CO 4:   To analyze the reflectors used along with antennas and study the experimental arrangements for measuring the radiation properties of antenna.
CO 5:   To interpret the concepts of ground wave Propagation, Space-Wave
CO 6:   Propagation, various factors affecting radio wave propagation

(EC502PC) DIGITAL COMMUNICATIONS

CO 1:   To describe the process of Sampling, Quantization and PCM techniques
CO 2:   To analyze the error rate due to noise in the digital modulation techniques.
CO 3:   To understand and Implement the concepts of information theory for source
        Coding and discrete memory-less channels
CO 4:   To implement linear block codes and Convolutional codes for error detection and correction
CO 5:   To know the different types of Spread Spectrum Modulation.

EC503PC: LINEAR AND DIGITAL IC APPLICATION

CO 1:   CO1: To Summarize the basics of linear integrated circuits and explain operational amplifiers with applications
CO 2:   Able to explain the comparator circuits like Schmitt trigger, astable multivibrator etc
CO 3:   To describe analog to digital converters (ADC), and digital to analog converters (DAC) with its Specifications
CO 4:   To construct and explain the timer circuits
CO 5:   To interpret the applications of PLL and special ICs like 565,566

(EC504PC) COMPUTER ORGANIZATION AND ARCHITECTURE

CO 1:   Basic structure of a digital computer
CO 2:   Arithmetic operations of binary number system
CO 3:   The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.
CO 4:   Operating system functions, types, system calls.
CO 5:   Memory management techniques and dead lock avoidance operating systems' file system implementation and its interface.

(EC505PC) MICROPROCESSORS AND MICROCONTROLLERS

CO 1:   In depth Architectural Knowledge of microprocessor.
CO 2:   Various signals and interrupts of 8086 and their usage.
CO 3:   Fundamental programming using 8086.
CO 4:   Interfacing Various Devices and Working.
CO 5:   Working and programming of microcontroller.

PROFESSIONAL ELECITIVE-I
(EC511PE) ARTIFICIAL NEURAL NETWORKS

CO 1:   Explain the function of artificial neural networks of the Back-prop, Hopfield and SOM type
CO 2:   Explain the difference between supervised and unsupervised learning
CO 3:   Describe the assumptions behind, and the derivations of the ANN algorithms dealt with in the course
CO 4:   Give example of design and implementation for small problems
CO 5:   Implement ANN algorithms to achieve signal processing, optimization, classification and process modeling

(CS512PE) JAVA PROGRAMMING

CO 1:   Design, write and test a java program to implement a working understand the Write code to define classes and interfaces that uses class libraries such as java.lang, java.util,java.io.

CO 2:   Use exception handling and multithreading in programs.

CO 3:   Develop GUI applications.

CO 4:   Give object oriented solutions for the complex and real world problems.

(EC513PE) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

CO 1:   Able to calculate the basic parameters like voltage, resistance etc. And predict the behavior of the instrument.

CO 2:   Able to differentiate working and design the different digital voltmeters and signal generators.

CO 3:   Able to interpret working and design the CRO and Able to calculate the frequency and time by using CRO.

CO 4:   Explain the different types of the transducers and basic working principle.

CO 5:   Able to design different types of bridges and unknown components are determined

(EN506HS) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

After completing this course, the student will be able to:

CO 1:   Understand the importance of vocabulary and using in real life situations.

CO 2:   Apply reading strategies to enhance reading comprehension skills

CO 3:   Compose different kinds of Writing: Formal Letters, Précis Writing, Essay Writing and Technical Report Writing.

CO 4:   Develop presentation skills to apply in professional life.

CO 5:   Apply Techniques to clear group discussions and Interviews.

(EC509PC) MICROPROCESSORS AND MICROCONTROLLERS LAB

After completing this course, the student will be able to:

CO 1:   Apply the fundamentals of assembly level programming of microprocessors.

CO 2:   Build a program on a microprocessor using instruction set of 8086.

CO 3:   Design and implement 8051 microcontroller based systems

CO 4:   Contrast how different I/O devices can be interfaced to processor and will explore several techniques of interfacing.

(EC512PC) LINEAR AND DIGITAL IC APPLICATIONS LAB

CO 1:   Students will have a thorough understanding of operational amplifier (741).

CO 2:   Students will be able to design circuits using operational amplifiers for various applications.

CO 3:   Students will be able to design various combinational circuits using various Digital Integrated IC's.

CO 4:   They can know the differences between Linear and Digital Integrated IC's.

CO 5:   Students will demonstrate their knowledge by designing analog circuits & digital circuits

III YEAR II SEMESTER

(MB601HS) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
CO 1:   Understand the internal and external decisions to be made by managers
CO 2:   Analyze the demand and supply conditions and assess the position of a company
CO 3:   Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
CO 4:   Analyze real-world business problems with a systematic theoretical framework.
CO 5:   Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.

(EC602PC) MICROWAVE ENGINEERING
After completing this course, the student will be able to:
CO 1:   Ability to describe the characteristics of waveguides and micro strip lines.
CO 2:   Learn the principle of operation of klystron theory for microwave signal generation and amplification
CO 3:   Learn the principle of operation of magnetron and TWT for microwave signal generation and amplification
CO 4:   Differentiate the principle of operation of solid state devices and Interpret the theory for microwave signal generation and amplification
CO 5:   Ability to do experiments for the measurement of RF power, Impedance, Attenuation, Frequency, VSWR etc.

(EC603PC) COMPUTER NETWORKS
CO 1:   Explain the hierarchical, layered structure of typical network architecture. .
CO 2:   Explain data link layer protocols like Stop and wait HDLC and PPP.
CO 3:   Explain the Theory involved in network layers and protocols.
CO 4:   Explain the Theory involved in network, transport and application layers and protocols.
CO 5:   Explain the Encryption and decryption.

(EC604PC) DIGITAL SIGNAL PROCESSING
CO 1:   Perform time frequency and Z transform analysis on signals and systems
CO 2:   Understanding the inter-relationship between DFT and various transforms
CO 3:   Understand the significance of various filter structures
CO 4:   Design a digital filter for a given specification.
CO 5:   Understand multi rate Digital signal processing

.PROFESSIONAL ELECTIVE-II
(EC621PE) TELECOMMUNICATION SWITCHING SYSTEMS
CO 1:   Describe the Elements of switching systems.
CO 2:   Calculate network traffic load and parameters

CO 3:   Classify different switching systems and Interpret the switching network configurations
CO 4:   Explain the signaling techniques
CO 5:   Explain subscriber loop systems, routing and protocol for ISDN.

(EC622PE) TELEVISION ENGINEERING

CO 1:   Expected to understand the concept of TV transmission and reception.
CO 2:   Acquired knowledge about monochrome TV receiver.
CO 3:   Expected to learn about VHF.&UHF tuners
CO 4:   Expected to learn about color separation, color coding etc.,
CO 5:   Expected to learn about color receiver & digital TV receiver.

(EC623PE) NANO MATERIALS AND TECHNOLOGY

CO 1:   Understand the basic concepts of Nano technology.
CO 2:   Understand the basic concepts of Nano materials
CO 3:   Familiar with fabrication process of Nano Technology.
CO 4:   Known the scaling and role of electrons in solids and Nano Structures.
CO 5:   Known the structures of Nano Devices.

OPEN ELECTIVE-I
(CE611OE) CONSTRUCTION MATERIALS (CE)

CO 1:   Students are get knowledge of various Materials Like Stones, Bricks and Concrete Blocks
CO 2:   Students are Gain Basic Knowledge on Materials like Lime, Cement, Aggregates and Mortar.
CO 3:   Students are known About Concrete Ingredients, Manufacturing Process and Tests on It.
CO 4:   Students are Gain About Basic Knowledge on Timber and Other Materials
CO 5:   Students are get knowledge on Modern construction materials.

(CE612OE) WASTE MANAGEMENT (CE)

CO 1:   Understand the standards for feed water in various industries and different theories in reducing the concentration of waste water.
CO 2:   Understand the effects of discharging waste water into streams and the direct and indirect impacts on aquatic animals and humans.
CO 3:   Understand the working procedure in various industries sources, characteristics and effects of waste, also the treatment methods depending upon the type of waste.
CO 4:   Know the combined treatment methods of liquid waste, effective methods of waste disposal and their limitations.
CO 5:   Understand the waste disposal methods and requirement of treatment plants.

(EE611OE) SOLAR PHOTOVOLTAIC SYSTEMS (EEE)

CO 1:   Understand the basics of solar energy and its geometry.
CO 2:   Analyze the various topologies of solar photovoltaic cells.
CO 3:   Understand the protection and measurement of solar photovoltaic system.

CO 4:   Understand the design considerations of solar photovoltaic system.
CO 5:   Analyze the various maximum power point tracking techniques.

(EE612OE) ELECTRICAL POWER GENERATION SYSTEMS (EEE)
CO 1:   Understand the electrical power generation process from Thermal and Nuclear power stations.
CO 2:   Analyze the electrical power generation from Hydro and Gas power stations.
CO 3:   Analyze the electrical power generation by using solar energy.
CO 4:   Understand the electrical power generation from wind energy & biomass energy.
CO 5:   Know the working of fuel cells and ocean energy conversion.

(ME611OE) ADVANCED ENGINEERING MATERIALS (ME)
CO 1:   Acquire an understanding of the main concepts related to the structure and properties of Advanced materials
CO 2:   Understand the basic concepts of ferrous and nonferrous metals and alloys.
CO 3:   Understand the ceramics and composite materials
CO 4:   To understand the application of super alloys and intermetallic
CO 5:   Understand the basic methods of manufacturing various types of composite materials.

(ME612OE) INTRODUCTION TO AUTOMOBILE ENGINEERING (ME)
Analyze the basic lay-out of automobile, working and other details about I.C Engines used in automobiles.
CO 1:   To gain the knowledge on working of ignition, Electrical systems.
CO 2:   Understand how the transmission system works and the working knowledge of various Components in transmission system.
CO 3:   Students will able to explain working principle of various parts of automobile such as axles, steering system and Suspension System.
CO 4:   Understand the various braking systems and pollution standards and its significance.

(EC611OE) PRINCIPLES OF COMMUNICATIONS (ECE)
CO 1:   Work on various types of modulations.
CO 2:   Should be able to use these communication modules in implementation.
CO 3:   Will have a basic understanding of various wireless and cellular, mobile and telephone communication systems.

(EC612OE) BASIC ELECTRONC CIRCUITS SIMULATION & DESIGN (ECE)
CO 1:   Describe circuits for PSpice simulation.
CO 2:   Understand the types of dc - ac and their output variables analysis
CO 3:   Understand the response of Transient analysis and obtain their output variables.

CO 4:   Students can able to analyze and develop simulation circuit for different applications.

(CS611OE) SOFTWARE ENGINEERING (CSE)
CO 1:   Apply software engineering principles and techniques.
CO 2:   Analyze software system requirements.
CO 3:   Produce efficient, reliable, robust and cost-effective software solutions.
CO 4:   Apply testing strategies.
CO 5:   Ensure good quality software.

(CS612OE) DATABASE MANAGEMENT SYSTEMS (CSE)
CO 1:   Design Entity- Relationship Model for enterprise level databases.
CO 2:   Develop the database and provide restricted access to different users of database and formulate the Complex SQL queries.
CO 3:   Analyze various Relational Formal Query Languages and various Normal forms to carry out Schema refinement
CO 4:   Use of suitable Indices and Hashing mechanisms for real time implementation.
CO 5:   Analyze various concurrency control protocols and working principles of recovery algorithms.

(HS607MC) GENDER SENSITIZATION
(MANDATORY COURSE)

(EC605PC) MICROWAVE ENGINEERING AND DIGITAL COMMUNICATIONS LAB
Upon the completion of this course, the student will be able to
CO 1:   Energize microwave bench and work with various components present in the bench.
CO 2:   Do standing wave analysis and measure scattering coefficients of various microwave components.
CO 3:   Generate modulated/coded waveform for a given Digital/Hybrid modulation scheme and perform demodulation.
CO 4:   Assess the amount of bandwidth/bit rate required in each modulation scheme and compare the schemes

(EC606PC) DIGITAL SIGNAL PROCESSING LAB
Upon the completion of this course, the student will be able to
CO 1:   To understand about the basic signal generation
CO 2:   To learn Fourier Transform Concepts
CO 3:   To design FIR filters
CO 4:   To design IIR filters.
CO 5:   Demonstrate their abilities towards DSP processor based implementation of DSP systems

(HS607MC) INTELLECTUAL PROPERTY RIGHTS
(MANDATORY COURSE)
After completion of the course the student will be able to

CO 1:   Understand the fundamentals of intellectual properties and its agencies.
CO 2:   Know the trade mark registration process and its rights.
CO 3:   Understand the fundamentals of copy rights and patent law.
CO 4:   Know the trade secret determination and protection.
CO 5:   Know the recent developments in protection of intellectual property rights.

IV YEAR I SEMESTER

(MS701HS) MANAGEMENT SCIENCE
CO 1:   About management functions, theories and Organizational structures.
CO 2:   About Production methods, Techniques under quality control and inventory control.
CO 3:   About functions & importance of HRM, Marketing functions and product life cycle.
CO 4:   About techniques in Networking for time required to complete the project.
CO 5:   About Corporate strategy implementation methods and other few contemporary management practices.

(EC702PC) VLSI DESIGN
CO 1:   Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
CO 2:   Draw the layout of any logic circuit which helps to understand and estimate parasitic of any circuit.
CO 3:   Design different types of gate level modeling using CMOS inverter and analyze their transfer characteristics
CO 4:   Design simple memories using MOS transistors and can understand design of large memories.
CO 5:   Understand the Verilog HDL languages.

PROFESSIONAL ELECTIVE-III
(EC731PE) EMBEDDED SYSTEMS DESIGN
Upon the completion of this course, the student will be able to
CO 1:   Understand the Embedded systems concepts
CO 2:   Understand the architecture of PIC Microcontrollers and its operations.
CO 3:   Understand the memory mapping and interrupts of PIC Microcontrollers.
CO 4:   Understand the basic concepts of RTOS, Windows & LINUX
CO 5:   Understand the hardware and software architectures embedded systems.

(EC732PE) OPTICAL COMMUNICATIONS
Upon the completion of this course, the student will be able to
CO 1:   Understanding characteristics of the optical fiber and various losses in the optical communication systems.
CO 2:   Ability to analyze the Types of Dispersions and various types of joints in fiber optics.
CO 3:   Understand basics, characteristics of LASER Diodes & LEDs and analyze how to launch the Power into Optical Fiber.
CO 4:   Understand basics of Optical Detectors and their characteristics

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CO 5:   To gain the Knowledge of Optical System Design and the WDM concepts

(EC733PE) BIOMETRIC SYSTEMS
At the end of the course students should be able to:
CO 1:   Understand differences between a biometric method and a biometric system.
CO 2:   Organize and conduct biometric data collection processes.
CO 3:   Understand the concepts of IRIS recognition.
CO 4:   Understand the concepts of FACE recognition.
CO 5:   Understand how to use biometric databases in system evaluation.

PROFESSIONAL ELECTIVE-IV
(EC706PC) DIGITAL IMAGE PROCESSING
CO 1:   Review the fundamental concepts of a digital image processing system and analyze images in the frequency domain using various transforms.
CO 2:   Evaluate the techniques for image enhancement and image restoration.
CO 3:   Analyze the Image segmentation concepts
CO 4:   Categorize various compression techniques.
CO 5:   Evaluate the techniques for image morphological processing and image restoration

(EC742PE) SATELLITE COMMUNICATIONS
Upon the completion of this course, the student will be able to
CO 1:   Understand the communication satellite mechanics
CO 2:   Know about the satellite internal sub systems for communication applications
CO 3:   Design the power budget for satellite links
CO 4:   Understand various constellations of satellite and their applications
CO 5:   Know about the principles of GPS
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(CS743PE) NETWORK SECURITY
Upon the successful completion of this course, the student will be able to:
CO 1:   Analyze the importance of Network Security in real world.
CO 2:   Designing and analysis of different encryption Algorithms.
CO 3:   Designing and analysis of different Authentication Algorithms.
CO 4:   Implementation of MAC and Hash functions, security at different layers of a network.
CO 5:   Explore different types of intruders and viruses

OPEN ELECTIVE-II
(CE721OE) DISASTER MANAGEMENT (CE)
CO 1:   Application of different approaches, human ecology in geographical researches
CO 2:   Have the knowledge on planetary hazards/disasters
CO 3:   Know the principles and measures to control various disasters/exogenous hazards

CO 4: Plan for face types of exogenous hazards, impacts and mitigation techniques & management system

CO 5: Apply emerging approaches in different types of disasters

(CE722OE) REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM (CE)

CO 1: To apply photogrammetry in different aspects in basic remote sensing elements.

CO 2: Analyze the Energy interaction in the atmosphere in earth surface features.

CO 3: Application of GIS data, data representation in various elements like manual digitizing and scanning.

CO 4: Analyze spatial & attribute data for solving spatial problems.

CO 5: Use the RS & GIS applications in various aspects.

(EE721OE) MAINTAINANCE OF ELECTRICAL SYSTEMS (EEE)

CO 1: Identify the Engineering materials, properties and applications.

CO 2: Test the domestic appliances.

CO 3: Know the use of UPS and SMPS and maintenance of power devices.

CO 4: Understand the maintenance of batteries, ups/inverter, motors and starters.

CO 5: Rescue a person met with Electric shock.

(EE722OE/ EE511PE) RENEWABLE ENERGY SOURCES (EEE)

CO 1: Learn the principles of solar radiation and collection of solar energy.

CO 2: Understand the various solar energy storage methods and solar applications.

CO 3: Analyze the Wind energy conversion and Biomass energy conversion.

CO 4: Analyze the geothermal energy conversion and ocean energy conversion.

CO 5: Analyze the various direct energy conversion devices.

(ME721OE) FUNDAMENTALS OF REFRIGERATION & AIR CONDITIOING (ME)

CO 1: Ability to understand various refrigeration systems.

CO 2: Ability to understand the operation of various devices of VCR system.

CO 3: Ability to demonstrate the working of refrigeration equipments.

CO 4: Ability to understand various psychometric processes.

CO 5: Ability to explain the air-conditioning equipment.

(ME722OE) INDUSTRIAL ROBOTICS (ME)

CO 1: Understand the basic components of Robots and differentiate types of robots and robot grippers.

CO 2: Model forward and inverse kinematics of robot manipulators.

CO 3: Analyze forces in links and joints of a robot.

CO 4: Programme a robot to perform tasks in industrial applications.

CO 5: Design intelligent robots using sensors.

(EC721OE) PRINCIPLES OF SIGNAL PROCESSING (ECE)

CO 1:   Perform Fourier transform and Z transform analysis   on signals and systems
CO 2:   Understanding the inter-relationship between DFT and various transforms
CO 3:   Understand the Discrete Fourier series and various transforms
CO 4:   Ability to design various IIR digital filter structures
CO 5:   Ability to design a digital FIR filter for a given specification.

(EC623PE/EC722OE) NANO MATERIALS AND TECHNOLOGY (ECE)

After completion of the course the student will be able to
CO 1:   Understand the basic concepts of Nano technology.
CO 2:   Understand the basic concepts of Nano materials
CO 3:   Familiar with fabrication process of Nano Technology.
CO 4:   Known the scaling and role of electrons in solids and Nanostructures.
CO 5:   Understand the structures of Nan devices.

(CS721OE) OBJECT ORIENTED ANALYSIS AND DESIGN (CSE)

CO 1:   Demonstrate the concepts and principles of object oriented programming.
CO 2:   Understand the purposes, major components and key mechanisms of Class and Object Diagram.
CO 3:   Describe the basic resource management responsibilities of Interaction Diagram.
CO 4:   Knowledge on State-chart Diagram.
CO 5:   Applying the techniques for Component and Deployment Diagrams.

(EC703PC) VLSI & E-CAD LAB

Upon successful completion of this course, students should be able to:
CO 1:   Understand the concepts of digital system design methods through practical domain.
CO 2:   Design combinational and sequential circuits
CO 3:   Analyze and layout design of CMOS circuits in micron and submicron level using any platform
CO 4:   Learn techniques and engineering tools to design & implement.

IV YEAR II SEMESTER

PROFESSIONAL ELECTIVE-V
(EC851PE) CELLULAR AND MOBILE COMMUNICATIONS

Upon successful completion of this course, students should be able to:
CO 1:   Discuss cellular radio concepts.
CO 2:   Identify various propagation effects.
CO 3:   To have knowledge of the mobile antenna specifications.
CO 4:   Understand the concepts of handoffs and dropped calls.
CO 5:   Understand the GSM architecture and Classify multiple access techniques in mobile communication

(EC852PE) DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES

Upon successful completion of this course, students should be able to:

CO 1: Understand the concepts of Digital transform techniques and DSP implementation
CO 2: Understand the architectures of Programmable DSP Devices.
CO 3: Be able to write simple assembly language programs using instruction set of TMS320C54xx.
CO 4: Understand the architectures of analog devices like ADSP 2100, ADSP 2181 and Blackfin processor.
CO 5: Understand the interfacing techniques to memory and I/O devices to DSP devices.

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(CS853PE) INTERNET OF THINGS
Upon successful completion of this course, students should be able to:
CO 1: Understand the concepts of Internet of Things.
CO 2: Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
CO 3: Apply data analytics and use cloud offerings related to Internet of Things.
CO 4: Interpret the impact and challenges posed by Internet of Things leading to Industry perspective.
CO 5: Analyze applications of Internet of Things in real time scenario.

PROFESSIONAL ELECTIVE-VI
(CS861PE) SCRIPTING LANGUAGES
Upon successful completion of this course, students should be able to:
CO 1: Ability to create and run scripts using PHP.
CO 2: Create PHP authentication Methodology for security issues.
CO 3: Design, code, and test applications using Python scripts.
CO 4: Ability to use strings, list, tuples, and dictionaries in python script.
CO 5: Ability to create and run scripts using perl.

(EC862PE) RADAR SYSTEMS
Upon completion of the course, the students are able
CO 1: To derive and discuss the Range equation and the nature of detection.
CO 2: To apply Doppler principle to radars and hence detect moving targets.
CO 3: To understand the MTI and Doppler radars techniques.
CO 4: To understand the tracking radars techniques
CO 5: To refresh principles of antennas and propagation as related to radars, also study of transmitters and receivers.

(EC863PE) WIRELESS COMMUNCIATIONS AND NETWORKS
Upon successful completion of this course, students should be able to:
CO 1: Understand the Principles of wireless communications and fundamentals of wireless networking.
CO 2: Analyze various multiple access schemes used in wireless communication.
CO 3: Understand wireless wide area network and their performance analysis.
CO 4: Familiar with some of the existing and emerging wireless standards.

CO 5: Understand the concept of orthogonal frequency division multiplexing.

OPEN ELECTIVE - III
(CE831OE) PROJECT MANAGEMENT (CE)

CO 1: Handle the Project work with Proper Planning Scheduling including construction methods

CO 2: Use the mechanized construction equipments at different situations or any huge projects

CO 3: Have the knowledge of ISC -9000 Quality systems and environmental protection.

CO 4: To classify the contact management, estimation and project planning techniques

CO 5: Use the CPM – PERT Problems in project scheduling

(CE831OE) SAFETY ENGINEERING (CE)

CO 1: Know how to Handle and Protect the Machine and himself while working on it

CO 2: Know the Knowledge of lifting and carrying the materials and also maintenance of mechanical material handling equipment

CO 3: Understand the knowledge of safety rules and regulations of working at construction industry

CO 4: Understand the knowledge about working at all stages in different heights at construction site

CO 5: Know the knowledge of different types of noise and vibration, its causes, effects and controlling measures

(EE831OE) ELECTRICAL ENGINEERING MATERIALS (EEE)

CO 1: Understand various types of dielectric materials, their properties in various conditions.

CO 2: Understand the properties and importance of insulating and dielectric medium.

CO 3: Evaluate magnetic materials and their behavior.

CO 4: Evaluate semiconductor materials and technologies.

CO 5: Know the materials used in electrical engineering and applications.

(EE832OE) FUZZY LOGIC AND ITS APPLICATIONS (EEE)

CO 1: Operation and properties of crisp and fuzzy logic.

CO 2: Operation and properties of crisp relations and fuzzy relations.

CO 3: Laws and inference of classical propositional, predicate and fuzzy propositional logic.

CO 4: Membership value assignment.

CO 5: Methods of defuzzification and fuzzy rule based system.

(ME831OE) POWER PLANT ENGINEERING (ME)

CO 1: Understand the principle of various sources of energy, resources and development of power.

CO 2: To know the concept of internal combustion engine and gas turbine power plant.

CO 3: To know the concept of hydroelectric power plant.
CO 4: To know the concept of nuclear power stations and non-conventional power sources.
CO 5: Understand the power plant economics and environmental considerations.

(ME832OE) NANO TECHNOLOGY (ME)
CO 1: Apply engineering and physics concepts to the Nano-scale and non-continuum domain.
CO 2: Understand Carbon Nano Tubes structures and manufacturing process.
CO 3: Understand characterization techniques through various measurements to study electrical, mechanical, thermal properties of Nano materials.
CO 4: Understand the principles and microelectronics fabrication.
CO 5: Understand the concept of Convective Heat Transfer in Nano fluids.

(EC831OE) FUNDAMENTALS OF EMBEDDED SYSTEMS (ECE)
CO 1: Summarize the different development tool for embedded system, features of advanced buses for distributed data transfer in system design.
CO 2: Develop the different processors on hardware and software for the development of embedded system design.
CO 3: Contrast the basics of embedded system Firmware.
CO 4: Implement the concepts of RTOS in real time programming
CO 5: Understand the development of distributed embedded system design.

(EC733PE/EC832OE) BIOMETRIC SYSTEMS (ECE)
CO 1: Understand differences between a biometric method and a biometric system.
CO 2: Organize and conduct biometric data collection processes.
CO 3: Understand the concepts of IRIS recognition.
CO 4: Understand the concepts of FACE recognition.
CO 5: Understand how to use biometric databases in system evaluation.

(CS831OE) SOFTWARE PROJECT MANAGEMENT (CSE)
CO 1: Apply the practice of project management in delivering of projects.
CO 2: Evaluate the project against strategic, technical and economic criteria.
CO 3: Identify effort estimation and activity plan of a project.
CO 4: Categorize and prioritize actions for risk management.
CO 5: Evaluate the characteristics of various team structures.

(CS832OE) HUMAN COMPUTER INTERACTION (CSE)
CO 1: Identify and formulate characteristics and components of graphical user interface.
CO 2: Apply an interactive design process and universal design principles to designing HCI systems
CO 3: Analyze & implement various design paradigms for human computer interaction.
CO 4: Apply the navigation schemes through window, device and screen based

controls
CO   5:   Use HCI in the software process.