PO/PSO and CO's of all courses of the UG Programme

Name of the Department: Electronics Engineering

Name of the UG Programme: B.E. in Electronics Engineering

Programme Outcomes (PO)

PO1: Engineering knowledge: Apply the knowledge of mathematics, Science, Engineering fundamentals and an Engineering specialization to the solution of complex Engineering problems.

PO1: Problem Analysis: Identify, formulate, review research literature and analyse complex Engineering problems reaching substantiate conclusions using first principle of mathematics, natural sciences and Engineering sciences.

PO3: Design/development of solutions: Design solution for complex Engineering problems and design system components or process that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.

PO4: Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select and apply appropriate techniques, resources and modern Engineering and IT tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

PO6: The Engineer and society: Apply reasoning informed by the contextual knowledge to assess, societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional v practice.

PO7: Environment and sustainability: Understand the impact of the professional Engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.

PO9: Individual and team work: Function effectively as an individual and as a number or leader in diverse teams and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex Engineering activities with the Engineering community and with society at large such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member and leader in a team to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Programme Specific Outcomes (PSO)

PSO1:An ability to analyze & design electronic applications using Electronics Design Automation (EDA) tools & related softwares.

PSO2: An ability to develop and test electronics systems in the areas related to analog and digital electronics, signal processing, embedded systems and VLSI Design.

First Year: Semester I

Course Name:Engineering Mathematics-I	Course Code:GE-2101
GE-2101 CO-1	Apply the knowledge of differentiation to develop the Mathematical equations and compute geometrical measures
GE-2101 CO-2	Determine the expansion and derivatives of functions of Multiple variables and use it to find extreme values of functions.
GE-2101 CO-3	Evaluate the integrals of single, multiple variables and use it to measure the dimensions of various geometrical figures.
GE-2101 CO-4	Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single, multiple variables.

Course Name:Engineering Mathematics-II	Course Code:GE-2102
GE-2102 CO-1	Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems
GE-2102 CO-2	Analyse the functions of complex numbers and variables, prove Mathematical equations and evaluate the complex integrals
GE-2102 CO-3	Use Matrix method to solve linear equations , evaluate eigen values - eigen vectors and its applications.
GE-2102 CO-4	Measure the statistical parameters and derive the equations of best fit curves

Course Name:Communication Skill	Course Code:GE-2107
GE-2107 CO-1	Explain the basics of communication process as well as identify the barriers in communication.
GE-2107 CO-2	Classify and describe the different Speech Sounds of English Language.
GE-2107 CO-3	Apply different strategies and techniques of presentations, interviews and group communication.
GE-2107 CO-4	Drafting reports, memos and emails, considering the professional etiquettes and ethics with appropriate content and context.

Course Name:Social Science	Course Code:GE-2108
GE-2108 CO-1	Explain the basic concepts of Social Sciences.
GE-2108 CO-2	Describe the development of various Civilizations and their Culture.
GE-2108 CO-3	Analyze the Impact of Industrialization on society and discuss the Fundamental Concepts of Society.
GE-2108 CO-4	Explain Industrial Organization and Management.

Course Name:Engineering Physics Course Name: Engineering Physics (Lab.)	Course Code:GE-2105 and GE 2106
GE 2105 & GE2106 CO1	Examine the intensity variation of light due to interference, diffraction and its applications.
GE 2105 . CO2	Explain fundamentals of quantum mechanics and its application to problems dealing with quantum particle.
GE 2105 & GE2106 CO3	Develop ability to classify and analyze the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands for device applications.
GE 2105 & GE2106 CO4	Analyze the motion of charged particle in electric and magnetic fields and its applications to electron optic devices.
GE 2105 & GE2106 CO1	Illustrate working principle of lasers, ultrasonic waves and its properties for useful applications in the field of industry.

Course Name:Engineering Mechanics Engineering Mechanics (Lab.)	Course Code:CV-2101 - CV2102
CV-2101- CO 1	An ability to apply the concept of applied mechanics and can solve problems on planar force system for friction as well as frictionless surfaces.
CV-2101- CO 2	An ability to analyze pin jointed truss frame structure and beam structure analytically and graphic
CV-2101- CO 3	An ability to understand centroid, moment of inertia, product of inertia and mass moment of inertia and can find properties of surfaces.
CV-210- 1CO 4	An ability to determine the dynamic variables of moving body, understand working principle of simple lifting machine.

Course Name:Introduction to Computer Programming Introduction to Computer Programming (Lab.)	Course Code:IT2101 Course Code: IT-2102
IT2101, IT2102 CO1	Understand computer system, basics of algorithm & flowchart, and demonstrate straight line program using basic 'C' programming language constructs.
IT2101 IT2102 CO2	Design & Develop programs using different loop control structures, user defined functions, and Pointers.
IT2101 IT2102 CO3	Analyze and apply concepts of different dimensional Arrays as a data structure & development of programs using the same.
IT2101 IT2102 CO4	Design and develop programs using basics of Strings, Structures, union and Files in 'C' language.

Course Name:Electrical	Course Code:EL 2101

Engineering Elect. Eng. Lab	EL-2102 (Lab.)
EL 2101 & EL 2102- CO-1	Reproduce fundamentals of dc circuits, single phase, and three phase ac circuits.
EL 2101 & EL 2102- CO-2	Analyse dc circuits, single phase and three phase ac circuits for basic electrical quantities such as current, voltage, power etc.
EL 2101 & EL 2102- CO-3	Explain construction, working, testing, and applications of various electrical machines.
EL 2101 & EL 2102- CO-4	Analyse performance of various electrical machines.
EL 2101 & EL 2102- CO-5	Perform laboratory experiments and demonstrate competency in collecting, interpreting, analysing data, communicate and present effectively through laboratory journals.

Course Name:Engineering Graphics Engineering Graphics Lab.	Course Code:ME2101 ME-2102
ME2101 ME-2102 CO1	Transform orthographic projections into isometric projections and vice versa.
ME2101 ME-2102 CO2	Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects.
ME2101 ME-2102 CO3	Built the development of lateral surfaces of various solids and their cut section.
ME2101 ME-2102 CO4	Predict the intersections and intersections of various solid objects.
ME2101 ME-210 2CO5	Justify the use of software tools used for Two dimensional drawings.

Course Name:Workshop Practice	Course Code:ME 2103
CO1	Understand the carpentry tools, joints, machineries and its applications
CO2	Understand the fitting tools, measuring instruments, machineries and its applications
CO3	Understand the smithy tools furnaces and hand and power forging equipment's
CO4	Understand Gas and Electric welding processes, utility, tools and its applications

Course Name:Engineering Mathematics-I	Course Code:GE-2101
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EL 2101 & EL 2102- CO-1	Reproduce fundamentals of dc circuits, single phase, and three phase ac circuits.
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ME2101 ME-2102 CO4	Predict the intersections and intersections of various solid objects.
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Course Name:Workshop Practice	Course Code:ME 2103
CO1	Understand the carpentry tools, joints, machineries and its applications
CO2	Understand the fitting tools, measuring instruments, machineries and its applications
CO3	Understand the smithy tools furnaces and hand and power forging equipment's
CO4	Understand Gas and Electric welding processes, utility, tools and its applications

Course Name: Electronic Devices (T/P)	Course Code:EE2201/EE2202
CO1	Students will be able to understand the concepts of Energy Bands, Charge Carriers and various semiconductor devices like diodes and BJT
CO2	Students will be able to be familiarized with semiconductor device fabrication processes.
CO3	Students will be able to understand various configurations and their characteristics for BJT and MOSFET amplifiers
CO4	Students will be able to understand the concepts of Stabilization and operating points of BJT and MOSFET amplifiers

Course Name: Signals & Systems	Course Code:EE2203
CO1	Students will be able to classify continuous time signals and systems, transformation of independent variable.
CO2	Students will be able to analyze Fourier series, Fourier transform representation of continuous-time periodic and aperiodic signals.
CO3	Students will be able to determine and evaluate Laplace Transform of continuous time signals.
CO4	Students will be able to analyze time & frequency characterization of Signals and Systems & Sampling Theorem

Course Name: Lab : Computing using Python	Course Code: EE2204
CO1	Students will be able to understand syntax and semantics of language
CO2	Students will be able to understand and apply the basics of the programming language
CO3	Students will be able to understand and apply special language features
CO4	Students will be able to develop any application

Course Name:Digital Logic Design (T/P)	Course Code:EE2205/EE2206
CO1	Students will be able to simplify combination logic circuits using Boolean algebra and exhibit the methods to solve logical functions using K-map and Quine-Mc-Clauskey methods.
CO2	Students will be able to understand and apply the concept of combinational logic circuits in various digital systems.
CO3	Students will be able to understand and demonstrate the various codes and illustrate concept of logic family with their characteristics.
CO4	Students will be able to understand the working of Flip-flops and its use to design Synchronous counters and Design and demonstrate finite state machines.

Course Name:Network Analysis (T/P)	Course Code:EE2207/EE2208
CO1	Students should be able to apply and analyze nodal and mesh analysis on circuits
CO2	Students should be able to apply network theorems, initial and final conditions to analyze circuits
CO3	Students should be able to understand, apply and analyze circuits in

	transform domain
CO4	Students should be able to apply the concept of two – port networks to find different two-port parameters.

Second Year: Semester IV:

Course Name: Electronic Circuits (T/P)	Course Code:EE2251/2252
CO1	Students will be able to know the low frequency parameters and analysis of BJT, MOSFET and its configuration.
CO2	Students will be able to know the high frequency parameters and analysis of BJT, MOSFET and its configuration.
CO3	Students will be able to analyze amplifiers with and without feedback.
CO4	Students will be able to analyze Power amplifier and Oscillators.

Course Name: Microcontroller & its Applications(T/P)	Course Code: EE2253/2254
CO1	Students will be able to understand & Learn concept of Architecture of 8051 µc
CO2	Students will be able to apply the concept of programming language to interface I/O Devices
CO3	Students will be able to establish the serial communication between the I/O Devices.
CO4	Students will be able to design Data Acquisition System related to Industries

Course Name: Analog Communication (T/P)	Course Code:EE2255/EE2256
CO1	Students will be able to demonstrate and analyze various amplitude, angle modulation techniques.
CO2	Students will be able to understand various types of receivers & noise in communication system and investigate noise parameters.
CO3	Students will be able to understand pulse modulation & multiplexing techniques.
CO4	Students will be able to apply the concept of Radiation & Propagation of waves to design communication system

Course Name: Electromagnetic Fields	Course Code:EE2257
CO1	Students will be able to define and recognize different co-ordinate systems, apply different techniques of vector calculus to understand concepts of electromagnetic field theory.
CO2	Students will be able to determine the electromagnetic force exerted on charged particles, current elements, working principle of various electric and magnetic fields.
CO3	Students will be able to explain fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields in different media using the fundamental laws.
CO4	Students will be able to deduce and justify the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves.

Course Name: Lab : Electronics Workshop	Course Code: EE2258
CO1	Students will be able to identify different Electronics Components.
CO2	Students will be able to do mini project to enhance their practical Knowledge.
CO3	Students will be able to artwork, printing, Etching & drilling of PCB
CO4	Students will be able to work in a teamwork

Course Name: Fundamentals of Management	Course Code:GE2311
CO1	Students will be able to explain the Legal provision and Functions of Management.
CO2	Students will be able to analyze the role of Human Resource and Financial Management in the organization.
CO3	Students will be able to analyze the project life cycles.
CO4	Students will be able to identify tools and techniques for the marketing of goods and services.

Course Name: DigitalSignal Processing (T/P)	Course Code:EE2351/EE2302
CO1	Apply DFT and Z transform for the analysis of signals and systems
CO2	Construct and optimize structures for the realization of discrete Time system
CO3	Design of Analog and Digital Filters for given specifications
CO4	Understand fundamentals and architecture of DSP processor.

Course Name: Analog Integrated Circuits and its Application (T/P)	Course Code:EE2302/EE2304
CO1	Student will acquire knowledge of the fundamentals, the different Parameters and internal structure of the operational amplifier.
CO2	Student will analyze and design the linear applications of the operational amplifier.
CO3	Students will analyze and design active Butterworth filters using operational amplifier.
CO4	Student will analyze and design the non-linear applications of the operational amplifier.

Course Name: PE I : Computer Communication Network(T/P)	Course Code:EE2311/EE2312
CO1	Students will be able to Describe various protocols, models in Computer Networks
CO2	Students will be able to Compare Connectors, Network hardware,Media Types (cables, Wireless)
CO3	Students will be able to Design, implement and analyze simple computer networks.
CO4	Students will be able to Apply the different strategies and Operations of TCP/UDP, FTP, HTTP protocols

Course Name: PE I : Embedded System(T/P)	Course Code:EE2313/EE2314
CO1	Students will be able to understand & Learn concept of Architecture & organization of ARM.
CO2	Students will be able to understand & Learn concept of RTOS Architecture.
CO3	Students will be able to apply the concept of programming language to interface I/O Devices.
CO4	Students will be able to establish the communication between the different Devices.

Course Name: PE I : Algorithm & Data Structure (T/P)	Course Code:EE2315/EE2316
CO1	Students will be able to study the trade-off method Demonstrate and analyze various techniques.
CO2	Students will be able to demonstrate various operation on data Structure
CO3	Students will be able to understand various types Data Structure
CO4	Students will be able to implement various types algorithm and analyze performance of system.

Course Name: PE I : Applied Machine Learning (T/P)	Course Code:EE2317/EE2318
CO1	Students will be able to develop an appreciation for what is involved in learning from data, machine learning techniques that are suitable for the different applications
CO2	Students will be able to design an appropriate learning model from set of samples to meet the desired needs
CO3	Students will be able to compare different machine learning techniques and demonstrate the comprehension of the trade-offs involved in design choices
CO4	Students will be able to integrate machine learning algorithms with ensembling methods and explain modern technologies like deep and shallow learning

Course Name: OE I : Fuzzy Logic & Neural Network	Course Code:EE2331
CO1	Students will be able to apply the concepts of mathematics and fuzzy logic to define, and analyze uncertainty.
CO2	Students will be able to find solution for real time control problems using concepts of fuzziness.
CO3	Students will be able to compare the Artificial neurons to biological neurons and solve classification using ANN.
CO4	Students will be able to design and solve pattern recognition and classification problems using different learning methods

Course Name:OE I : Basics of Analog and Digital Communication Systems	Course Code:EE2332
CO1	Students will be able to understand different modulation and demodulation schemes for analog communication with the concept of noise.
CO2	Students will be able to understand different pulse analog and digital modulation techniques.
CO3	Students will be able to understand different digital modulation schemes.

CO4	Students will be able to understand the different coding techniques for communication systems.

Course Name:OE I : Biomedical Instrumentation		Course Code:EE2333
CO1	Students will be able to describe the basic concepts of biomedical instrumentation and principle of transducer used in biomedical instrumentation.	
CO2	Students will be able to explain cardiovascular, blood pressure measurement and analyze ECG, plethysmograph and spirogram .	
CO3	Students will be able to identify various techniques used in generation and measurement of x-rays, EMG and use of pacemakers, defibrillators in health care.	
CO4	Students will be able to recognize concept of Telemedicine, its applications and use of internet resource for hospital management system.	

Course Name: OE II : Data Acquisition & Signal Conditioning		Course Code:EE2341
CO1	Students will be able to describe the basic model of data acquisition system and the various methods and attributes of signal conditioning	
CO2	Students will be able to Identify the various types of data acquisition hardware and the serial data communication standards.	
CO3	Students will be able to distinguish different standards for connection of different programmable instruments like GPIB and SCPI	
CO4	Students will be able to define use of Ethernet, Medium Access control and USB	

Course Name: OE II : Fundamentals of Microprocessor		Course Code:EE2342
CO1	Students will be able to understand the architecture of 8085 and 8051.	
CO2	Students will demonstrate the ability to identify, Formulate and design program for an assigned task.	
CO3	Students will be able to interface Peripheral devices.	
CO4	Students will apply the knowledge of microprocessor and microcontroller in their respective field	

Course Name: OE II : Consumer Electronics		Course Code:EE2343
CO1	Students will be able to understand the knowledge of the safety aspects in the field of Electrical and Electronics products.	
CO2	Students will be able to analyze the basics of Audio and Video Systems.	
CO3	Students will be able to know about recent trends in Processors and computer peripherals, mobile and wireless technologies.	
CO4	Students will be able to understand the basics of refrigeration cycle and cooling system	

Course Name: Fundamentals of Economics	Course Code:GE2312
CO1	Relate their buyer behavior to particular product and the pricing in the market.
CO2	Examine and classify various market structure and factors of production and its role in production process.
CO3	Analyse the national income accounting and the various issues related to banking, taxation, and inflation.
CO4	Elaborate about international economics, foreign trade and its agreement, export, foreign exchange and the various international financial institutions.

Course Name: Control System Engineering	Course Code:EE2351
CO1	Students will be able to understand the use of block diagram and signal flow graph as a modeling tool and the role of feedback in control systems.
CO2	Students will be able to understand the response characteristics of basic first- and second-order dynamic systems. Be able to use Routh's criterion for absolute and relative stability analysis.
CO3	Students will be able to construct and recognize the properties of root-locus and its role in the analysis of control systems.
CO4	Students will be able to obtain frequency response indices. Be able to draw frequency response plots such as polar plot, Bode plot etc.

Course Name: Transmission Lines and Wave Guides	Course Code:EE2352
CO1	Students will be able to explain fundamental parameters of transmission line and its constraints in high frequency transmission of information.
CO2	Students will be able to make use of Transmission line to develop impedance matching networks and any communication system.
CO3	Students will be able to relate the propagation characteristics of electromagnetic waves in various wave guide structures.
CO4	Students will be able to analyze transmission line using Smith Chart and Design Impedance Matching network.

Course Name: Digital Communication (T/P)	Course Code:EE2353
CO1	Students will be able to learn pulse modulation & discuss the process of sampling, quantization & coding that is fundamental to the digital transmission of analog signals.
CO2	Students will be able to understand fundamental concepts & limits in information theory in the context of digital communication theory/
CO3	Students will be able to analyze mathematical model of digital communication systems.
CO4	Students will be able to apply error control coding techniques at the receiver.

Course Name: PE- II Internet of Things (T/P)	Course Code:EE2361/EE2362
CO1	Students will be able to understanding of IoT value chain structure (device, data cloud), application areas and technologies involved

CO2	Students will be able to understand IoT sensors andtechnological challenges faced by IoT devices, with a focus on wireless, energy, power, RF and sensing modules
CO3	Students will be able to market forecast for IoT devices with a focus on sensors
CO4	Students will be able to explore and learn about Internet of Things with the help of preparing projects designed for Raspberry Pi

Course Name: PE- II Digital CMOS Circuits (T/P)	Course Code:EE2363/EE2364
CO1	Students will be able to describe and interpret the basic concepts of MOS transistors
CO2	Students will be able to construct the ability to design a system, component or process as per needs and specifications.
CO3	Students will be able to analyze inverter design, characteristics and applications and Evaluate circuits using different CMOS
CO4	Students will be able to design arithmetic circuit blocks

Course Name: PE- II Digital Image Processing (T/P)	Course Code:EE2365/EE2366
CO1	Students will be able understand the basic concepts of digital image processing and f digital image geometry.
CO2	Students will be able implement the image enhancement and restoration techniques in spatial and frequency domain.
CO3	Students will be able apply and implement image segmentation techniques using edge detection and merging.
CO4	Students will be able apply different Image processing algorithms.

Course Name:PE IV : Object Oriented Programming (T/P)	Course Code:EE2367/EE2368
CO1	Students will be to understand the concept of concepts of Object Oriented Programming.
CO2	Students will be to analyze the using the concept of Inheritance, Polymorphism, Overloading
CO3	Students will be to choose the appropriate data structure and algorithm design method for a specified application.
CO4	Students will be to develop and use linear and non linear data structures and advanced features.

Course Name: OE III : Fuzzy Logic & Neural Network	Course Code:EE2381
CO1	Students will be able to apply the concepts of mathematics and fuzzy logic to define, and analyze uncertainty.
CO2	Students will be able to find solution for real time control problems using concepts of fuzziness.
CO3	Students will be able to compare the Artificial neurons to biological neurons and solve classification using ANN.
CO4	Students will be able to design and solve pattern recognition and classification problems using different learning methods

Course Name:OE III : Basics of Analog and Digital Communication Systems	Course Code:EE2382
CO1	Students will be able to understand different modulation and

	demodulation schemes for analog communication with the concept of noise.
CO2	Students will be able to understand different pulse analog and digital modulation techniques.
CO3	Students will be able to understand different digital modulation schemes.
CO4	Students will be able to understand the different coding techniques for communication systems.

Course Name:OE III : Biomedical Instrumentation	Course Code:EE2383
CO1	Students will be able to describe the basic concepts of biomedical instrumentation and principle of transducer used in biomedical instrumentation.
CO2	Students will be able to explain cardiovascular, blood pressure measurement and analyze ECG, plethysmograph and spirogram .
CO3	Students will be able to identify various techniques used in generation and measurement of x-rays, EMG and use of pacemakers, defibrillators in health care.
CO4	Students will be able to recognize concept of Telemedicine, its applications and use of internet resource for hospital management system.

Course Name: OE IV : Data Acquisition & Signal Conditioning	Course Code:EE2391
CO1	Students will be able to describe the basic model of data acquisition system and the various methods and attributes of signal conditioning
CO2	Students will be able to Identify the various types of data acquisition hardware and the serial data communication standards.
CO3	Students will be able to distinguish different standards for connection of different programmable instruments like GPIB and SCPI
CO4	Students will be able to define use of Ethernet, Medium Access control and USB

Course Name: OE IV : Fundamentals of Microprocessor	Course Code:EE2392
CO1	Students will be able to understand the architecture of 8085 and 8051.
CO2	Students will demonstrate the ability to identify, Formulate and design program for an assigned task.
CO3	Students will be able to interface Peripheral devices.
CO4	Students will apply the knowledge of microprocessor and microcontroller in their respective field

Course Name: OE IV : Consumer Electronics	Course Code:EE2393
CO1	Students will be able to understand the knowledge of the safety aspects in the field of Electrical and Electronics products.
CO2	Students will be able to analyze the basics of Audio and Video Systems.
CO3	Students will be able to know about recent trends in Processors and computer peripherals, mobile and wireless technologies.
CO4	Students will be able to understand the basics of refrigeration cycle and cooling system

Course Name: Digital System Design (T/P)	Course Code:EE2401/EE2402
CO1	Students will be able to understand hardware description language and able to design and simulate digital systems using different abstraction levels
CO2	Students will be able to design and analyse combinational and sequential logic circuits.
CO3	Students will be able to understand and apply timing issues in multiple contexts and design the circuit.
CO4	Students will be able to understand programmable devices and able to design digital systems using modern design tools

Course Name:PE III : Switching Theory & Finite Automata	Course Code:EE2411
CO1	Students will be able to design and analyze multilevel logic Network and Threshold logic for nanotechnologies.
CO2	Students will be able to analyze testing of combinational circuits, Fault Models
CO3	Students will be able to design and analyze the synchronous and asynchronous sequential circuits.
CO4	Students will be able to identify and test the sequential machines with experiments.

Course Name:PE III : Power Electronics	Course Code:EE2412
CO1	Students will be able to understand basic semiconductor physics and properties of power devices for circuit analysis using linear and non -linear operations.
CO2	Students will be able to design and Analyze power invertor circuits and learn to select suitable power electronic devices by assessing the requirements of application fields.
CO3	Students will be able to formulate analyze and design the converters for various load types.
CO4	Students will be able to identify the critical areas in application levels and derive typical alternative solutions, select suitable power converters to control Electrical Motors and other industry grade apparatus.

Course Name:PE III : Wireless Sensor Network	Course Code:EE2413
CO1	Students will be able to study basic wireless sensor technology and different types of sensor protocol
CO2	Students will be able to understand different routing challenges and design issue in wireless sensor
CO3	Students will to able to understand wireless sensor network management and traffic management issues
CO4	Students will to able to study basic wireless sensor technology and different types of sensor protocol

Course Name:PE III : VLSI Signal Processing	Course Code:EE2414
CO1	Students will be able to design architectures for DSP algorithms.
CO2	Students will be able to apply the optimisation concept in terms of area, speed and power on DSP systems.
CO3	Students will be able to optimize DSP arithmetic

CO4	Students will be able to design of algorithm structure for DSP algorithms based on algorithm transformation.

Course Name:PE IV : Wireless Communication (T/P)	Course Code:EE2421/EE2422
CO1	Students will be able to describe generations of wireless standard and understand cellular concepts to evaluate the signal reception performance in a cellular network and traffic analysis with given quality of service constraints.
CO2	Students will be able to determine the type and appropriate model of wireless fading channel based on the system parameters and the property of the wireless medium.
CO3	Students will be able to describe Equalization & Diversity techniques, compare various wireless systems standards.
CO4	Students will be able to understand the importance of wireless networking and its applications.

Course Name:PE IV : RF and Microwave (T/P)	Course Code:EE2423/EE2424
CO1	Students will be able to apply concepts of Fields and Networks to study working principles of specific microwave active/passive devices, transmission lines/microwave devices.
CO2	Students will be able to analyze microwave networks and components using S-parameters.
CO3	Students will be able to design of microwave filters by various methods, Microwave solid state devices.
CO4	Students will be able to apply concepts of instrumentation and measurements to study microwave measurement of power, frequency and VSWR , impedance for the analysis and design of circuits

Course Name:PE IV : Analog VLSI Design (T/P)	Course Code:EE2425/EE2426
CO1	Students will be able to understand small signal model of MOS transistor and design using SPICE modeling
CO2	Students will be able to analyze single stage and differential amplifier with frequency response.
CO3	Students will be able to analyze and Design basic analog circuits such as current mirrors, active load, biasing circuits.
CO4	Students will be able to illustrate performance parameter of operational amplifier.

Course Name:PE IV : Operating Systems (T/P)	Course Code:EE2429/EE2430
CO1	Students will be able to understand the concepts of operating systems and processes
CO2	Students will be able to learn processes, threads and memory management and storage structures
CO3	Students will be able to evaluate the algorithms and solutions for operating system management
CO4	Students will be able to analyze the security issues in operating systems

Course Name:PE V : Industrial Automation	Course Code:EE2431
CO1	Students will be able to describe working of various blocks of basic industrial

	automation system
CO2	Students will be able to connect the peripherals with the PLC iii. Use various PLC functions and develop small PLC programs iv. Summarize Distributed control system and SCADA system
CO3	Students will be able to connect the peripherals with the PLC iii. Use various PLC functions and develop small PLC programs iv. Summarize Distributed control system and SCADA system
CO4	Students will be able to connect the peripherals with the PLC iii. Use various PLC functions and develop small PLC programs iv. Summarize Distributed control system and SCADA system

Course Name:PE V : Nano Electronics	Course Code:EE2432
CO1	Students will be to understand describe the fundamentals of classical CMOS technology and the issue in scaling MOSFET in the sub100nm regime
CO2	Students will be to understand explain ideal , nonideal capacitor voltage characteristics MOS transistor and quantum physics of nanomaterials
CO3	Students will be to understand demonstrate frabrication technology for MOS transistors with new device structure and nano materials
CO4	Students will be to understand illustrate Chemical process for nano materials used in semiconductor industry to produce thin films.

Course Name:PE V : Optical Communication	Course Code:EE2433
CO1	Students will be to understand the fundamental principles of optics and light wave to design optical fiber communication systems
CO2	Students will be to differentiate the types of losses in optical fiber link.
CO3	Students will be to analyze different types of sources & detectors in fiber optics.
CO4	Students will be to explore different methods of loss measurement in fiber optics.

Course Name:PE V : RF Circuit Design	Course Code:EE2434
CO1	Students will have an ability to demonstrate in- depth knowledge of general RF circuits, components, fundamental parameters of transmission line and its constraints in high frequency transmission of information
CO2	Students will be able to understand and use Smith Chart for developing circuits in RF applications.
CO3	Students will be able to design impedance matching networks.
CO4	Students will be able to design passive RF filters and RF power amplifiers.

Course Name:PE VI : E-Commerce & Data Analytics	Course Code:EE2441
CO1	Students will be able to understand of contemporary ecommerce concepts and terminology, and the processes and management decisions that are involved in launching, operating and managing business activity on the World Wide Web.
CO2	Students will be able to analyze and understand the human, technological and business environment associated with e-commerce.

CO3	Students will be able to define and analyze the concept of electronic data interchange and its legal, social and technical aspects.
CO4	Students will be able to define and analyze the security issues over the web, the available solutions, future aspects of e-commerce security, concept of E-commerce and electronic payment system

Course Name:PE VI : MEMS	Course Code:EE2442
CO1	Students will be able to understand working principles of MEMS technology.
CO2	Students will be able to learn the basic principles and applications of Micro fabrication and micromachining processes.
CO3	Students will be able to discuss various applications of RF MEMS.
CO4	Students will be able to classify types of microsensors and micro actuators used in Micro systems

Course Name:PE VI : Biomedical Instrumentation	Course Code:EE2443
CO1	Students will be able to understand the basic concepts of biomedical instrumentation and principle of transducer used in biomedical instrumentation
CO2	Students will be able to understand cardiovascular, blood pressure measurement and analyze ECG, plethysmograph and spirogram
CO3	Students will be able to understand various techniques used in generation and measurement of x-rays, EMG and use of pacemakers, defibrillators in health care.
CO4	Students will be able to understand concept of Telemedicine, its applications and use of internet resource for hospital management system.

Course Name:PE VI : Computer Organization	Course Code:EE2444
CO1	Students will be able to understand design levels of a computer system, System organization, memory hierarchy and virtual memory concept
CO2	Students will be able to understand the operation of fixed- and floating-point arithmetic units.
CO3	Students will be able to analyze hierarchical design of processor and control unit modules.
CO4	Students will be able to apply the concepts of pipelining and multiprocessing for computer system design.

Course Name: Mini Project	Course Code:EE2409
CO1	Students will be able to identify, formulate and analyze complex engineering problems through literature survey.
CO2	Students will be able to apply knowledge to assess health, social, safety and environmental issues.
CO3	Students will be able to implement core /multidisciplinary/ industry-based electronics projects in cost effective manner.
CO4	Students will be able to communicate technical details effectively

Course Name: Major Project	Course Code:EE2451
CO1	**Students will be able to identify, formulate and analyze complex engineering problems through literature survey.**
CO2	**Students will be able to apply knowledge to assess health, social, safety and environmental issues.**
CO3	**Students will be able to implement core /multidisciplinary/ industry-based electronics projects in cost effective manner.**
CO4	**Students will be able to communicate technical details effectively**