Department of Applied Electronics & Instrumentation Engineering

Programme Outcomes (POs) and Programme Specific Outcomes (PSOs):

PO No	Programme Outcomes (POs)
PO1	**Engineering knowledge** -Ability to apply the knowledge of mathematics, physical sciences and computer science and engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis** -Ability to identify, formulate and analyze complex real life problems in order to provide meaningful solutions by applying knowledge acquired in computer science and engineering.
PO3	**Design/development of solutions** -Ability to design cost effective software / hardware solutions to meet desired needs of customers/clients.
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 in the field of computer science and engineering.
PO5	**Modern tool usage** -Create, select and apply appropriate techniques, resources and modern computer science and engineering 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 engineering 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 member 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:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO NO	**Programme Specific Outcomes (PSOs)**
PSO 1	Ability to explore the design, installation & operation of the basic instrumentation systems used in industrial environments.
PSO2	Ability to use scientific & engineering fundamentals, skills & tools to formulate, solve &analyze instrumentation problems related to industry & research.

COURSE OUTCOME

Course Name: Mathematics – III
Course Code:(M 301
Course Outcome:

On successful completion of the learning sessions of the course, the learner will be able to:
CO1: Recall the underlying principle and properties of Fourier series, Fourier transform, probability distribution of a random variable, calculus of complex variable, partial differential equation and ordinary differential equation.
CO2:Exemplify the variables, functions, probability distribution and differential equations and find their distinctive measures using the underlying concept of Fourier series, Fourier transform, probability distribution of a random variable, calculus of complex variable, partial differential equation and ordinary differential equation.
CO3:Apply Cauchy's integral theorem and the residue theorem to find the value of complex integration, and compute the probability of real world uncertain phenomena by indentifying probability distribution that fits the phenomena.
CO4:Solve partial differential equation using method of separation of variables and ordinary differential equation using techniques of series solution and special function (Legendre's and Bessel's).
CO5:Find the Fourier series and Fourier transform of functions by organizing understandings of underlying principles and also evaluate the integral using Parseval's identity.

Course Name: Analog Electronic Circuits
Course Code: EI 301
Course Outcome:
At the end of this course students will be able to
CO1: Explain the characteristics of diodes and transistors
CO2: Design and analyze various rectifier and amplifier circuits
CO3: Design sinusoidal and non-sinusoidal oscillators

CO4: Analyse the functioning of OP-AMP and design OP-AMP based circuits
CO5: Design ADC and DAC

Course Name: Digital Electronic Circuits
Course Code: EI 302
Course Outcome:
On completion of this Subject/Course the student shall be able to:
CO1: Interpret of the fundamental concepts and techniques used in digital electronics.
CO2: apply the concept of various number systems in digital design.
CO3: analyze and design various cost effective combinational and sequential circuits.
CO4: solve complex circuit problem by applying knowledge of digital electronics.

Course Name : Circuit Theory and Networks
Course Code: EI 303
Course Outcome:
On completion of this Subject/Course the student shall be able to:
CO1: Solve complex circuit problem by applying knowledge of circuit theorems.
CO2: Analyze dynamic performance of the networks using Laplace Transform.
CO3: Find out resonance of different circuit.
CO4: Analyze two port networks using A,B,C,D and Z,Y Parameter Model.
CO5: Design different types of filters.

Course Name : Electrical & Electronic Measurement &Instrumentation
Course Code: EI304
Course Outcome:
On completion of this Subject/Course the student shall be able to:
CO1: Apply the knowledge to measure a particular parameter using an appropriate measuring instrument
CO2: Calibrate and standardize the instruments applying the knowledge of calibration .
CO3: Design measuring instruments on requirement basis.
CO4: Apply the knowledge of the instrumentation and measurement systems in the real life applications

Course Name: Analog Electronics Lab
Course Code : EI 391
Course Outcome:
At the end of this course students will be able to:
CO1: Verify the working of diodes, transistors and their applications.
CO2:Build a common emitter/base/collector amplifier and measure its voltage gain.
CO3: Explore the operation and advantages of operational amplifiers.
CO4: Design different types of filters and apply the same to oscillators and amplifiers.
CO5: Design a circuit to convert an analog signal to digital one.

Course Name: Digital Electronic Circuits Lab
Course Code: EI 392
Course Outcome:
On completion of this course students will be able to:
CO1: operate laboratory equipment.
CO2: design digital circuits

CO3: construct, analyze, and troubleshoot the digital circuits.
CO4: measure and record the experimental data, analyze the results and prepare a formal laboratory report

Course Name: Circuits and Networks Lab
Course Code: EI 393
Course Outcome:
On completion of this Subject/Course the student shall be able to:
CO1:Apply the techniques and skills of modern engineering tools necessary for engineering practice.
CO2:Identify, formulate and solve engineering problems with simulation software.
CO3:Analyze transient response of series /parallel R-L-C circuit using simulation software.
CO4:Determine frequency response of different filters using simulation software

Course Name: Electrical & Electronic Measurement & Instrumentation Lab
Course Code: EI 394
Course outcome:
On completion of this Subject/Course the student shall be able to:
CO1: Apply the knowledge for calibration of different electrical meters.
CO2: Relate different static and dynamic characteristics of a measuring instrumentfora typical application.
CO3: Analyze the measured data statistically.
CO4: Reconstruct a given signal using the knowledge of Digital Storage Oscilloscope.

Course Name: Behavioural & Interpersonal Skills
Course Code: MC 381
Course Outcome:
After completion of this course students will be able to
CO1: It will equip the student to handle workplace interpersonal communication in an effective manner.
CO2: To enable students with strong oral and written interpersonal communication skills.
CO3: To prepare students to critically analyze workplace situations and take appropriate decisions.
CO4: To make students campus ready through proper behavioral and interpersonal grooming.
CO5: Integration of enhanced skill set to design and frame team based Project Report and Presentation.

Course Name: Physics-II
Course Code: PH 401
Course Outcome:
After completion of this course student will be able to
CO1: explain electron transport in metal-insulators and semiconductors using energy Band theory.
CO2: apply Schrödinger equation in variety of atomic scale problems including nanomaterials.
CO3: analyze the physics of various kinds of electric and magnetic materials CO4: justify the importance of Fermi energy level in turning electronic properties of various semiconductors

Course Name: Sensors and Transducers
Course Code: EI 401

Course Outcome:
Students should be able to
CO1: Illustrate the fundamental principles of various types of sensors.
CO2: Illustrate the different types of transducers available.
CO3: Employ appropriate sensors to perform engineering tasks and scientific research.
CO4: Design of different Sensors.
CO5: Reorganize the basics of modern sensors

Course Name: Microprocessors and Microcontrollers
Course Code: EI 402
Course Outcome:
On completion of this course, students will be capable of
CO1: Apply the knowledge of the internal architecture 8085/8086 microprocessors and 8051 for a specific application.
CO2: Analyzing various instructions related to particular programs for specific applications. CO3: Applying the knowledge of interfacing circuits to some real time applications CO4: Designing various microprocessor and microcontroller based systems for a specific application.
Course Name: Digital Signal Processing
Course Code: EI 403

Course Outcome:
The students will be able to:
CO1: Apply the knowledge about continuous and discrete time signals CO2: Understand the Fourier Transform, and examine the process of Quantization and the effects of finite register length
CO3: Understand and implement DFTs on long data sets such as speech signals and images.
CO4: Develop different types of FIR & IIR filter structures and their implementations CO5: Use of FFTs for efficient implementation of linear convolution
CO6: Excel in fields such as speech processing, audio signal processing, digital image processing, video and audio compression.

Courser Name: Electromagnetic Theory and Transmission Line
Course Code: EI-404
Course Outcome:
Student will be able to:
CO1: understand and interpret the physical meanings of gradient, divergence and curl, vector calculus and orthogonal coordinates.
CO2: apply the concept of steady fields and different associated laws in different cases and mediums and realize the physical significances of Maxwell's equations for static field. CO3: solve different problems of the time varying fields and correlate the Poynting vector and Poynting theorem.
CO4: understand the thorough treatment of the theory of electro dynamics, mainly from a classical field theoretical point of view, and includes such things as electrostatics and magneto statics, boundary conditions.
CO5: analyze the wave equations, and be able apply the concepts in transmission line, wave guide.
CO6: explain universal concepts in three-dimension real world, i.e., electro-magnetic wave propagation in free-space, dielectrics, conductors.
Paper Name: Physics II Lab
Paper Code: PH 491

At the end of the course students' will be able to
CO1 : demonstrate experiments allied to their theoretical concepts
CO2 : conduct experiments using semiconductors , dielectric and ferroelectrics
CO3 : classify various types of magnetic materials
CO4 : participate as an individual, and as a member or leader in groups in laboratory sessions actively
CO5 :analyze experimental data from graphical representations , and to communicate effectively them in Laboratory reports including innovative experiments

Course Name:Sensors and Transducers Lab
Course Code: EI 491
Course Outcome:
The students will be able to:
CO1: Illustrate the working of transducers and various transducers used for the measurement of various physical variables.
CO2: Analyze the characteristics of the transducers.
CO3: Design sensor based on the real time application.
CO4: Estimate the design specifications of different transducers.

Course Name: Microprocessors and Microcontrollers Lab
Course Code :EI 492
Course Outcome:
After completion of this course, the students will be able to
CO1: write microprocessor and microcontroller based programs to solve any given problem statement.
CO2: design microprocessor based systems for real time applications.
CO3: reconstruct microprocessor and microcontroller based interfacing as per the requirements.

Course Name: Digital Signal Processing Lab
Course Code: EI 494
Course Outcome:
After completion of the laboratory course students will be able to:
CO1: Understand various signals generation.
CO2: Compute the system output using convolution method with MATLAB Software package.
CO3: Analyze and Observe Magnitude and phase characteristics of different signals.
CO4: Calculate DFT, FFT, IDFT using MATLAB.
CO5: Analyze Magnitude and phase characteristics (Frequency response Characteristics) of digital LP,HP& FIR Butterworth filters.
CO6: Develop and Implement DSP algorithms in software using a Computer language such as C with TMS320C6713 floating point Processor.

Course Name: Environmental Science
Course Code: MC401
Course Outcome:
After completion of this subject students will be able to:
CO1 : Study the mathematics and calculations of population growth, material balance and sustainable development.
CO2 : Study the components and diversity of eco system.

CO3 : Study the fundamental knowledge of air pollution, calculations of earth's surface temperature, atmospheric window and lapse rate.
CO4: Acquire fundamental knowledge of water pollution and its consequences knowledge and calculations regarding BOD, COD.
CO5: Understand the basic concepts regarding noise and musical sound, decibel unit and its relation with sound intensity, reasons and consequences of noise pollution. CO6: Understand the concepts of land pollution and its remedies.

Course Name: Economics For Engineers
Course Code: HU 502
Course Outcome:
CO1 : To Identify various uses for scares resources
CO2 : To understand key economic concepts and implement in real world problems
CO3 : To apply critical thinking skills to analyze financial data and their impacts.
CO4 :To evaluate business performance through cost accounting principles

Course Name: Industrial Instrumentation
Course Code: EI501
Course Outcome:
CO1: Able to explain working principle of different measuring instruments CO2: Able to Describe the specification of different instruments and advantages and disadvantages.
CO3: Able to Measure different physical parameters like pressure, temperature, flow rate, level etc
CO4: Able to install the instrument

Course Name: Analog & Digital Communication Theory
Course Code: EI 502
Course Outcome
CO1: Able to analyze the performance of a baseband and pass band communication system in terms of
error rate and spectral efficiency.
CO2: Able to perform the time and frequency domain analysis of the signals in a communication system.
CO3: Able to select the blocks in a design of communication system.
CO4: Able to analyze Performance of spread spectrum communication system.

Course Name: Control Engineering
Course Code: EI 503

Course Outcome:
CO1: Apply Laplace transform and state space techniques to model dynamic systems.
CO2: Demonstrate an understanding of the fundamentals of control systems. CO3: Determine the time domain responses of first and second-order systems. CO4: Analyze the system behavior in frequency domain & the system stability using compensator.

Course Name: Optoelectronics And Fibre Optic Sensors
Course Code: EI 504A
Course Outcome:

After the completion of the course, earner will be able to:
CO1: compare double heterojunction LED, surface emitter LED, edge emitter LED, super luminescent LED, and semiconductor based LASER (p-n junction laser, double heterojunction laser, stripe geometry) as optoelectronic sources based on working principles and applications
CO2:compare optoelectronic detectors (p-n photodiode, p-i-n photodiode, avalanche photo diode, Schottky photodiode, hetero junction diode, phototransistor, LDR, photovoltaic cells, photo emissive cells) based on detector parameters, which are responsivity, efficiency, and working principle
CO3: select a suitable optical fiber for an engineering application, based on number of modes required, distance to be covered and V-parameter
CO4: justify the selection of intensity modulated fiber optic sensors, phase modulated fiber optic sensors, and spectrally modulatedfiber optic sensors for engineering applications, which are measurement of temperature, pressure, displacement, and liquid level. Justify optical fiber as communication channel

Course Name: Soft Computing
Course Code: EI 504B
Course Outcome:
After the completion of the course, earner will be able to:
CO1: justify the use of fuzzy logic for decision making in presence of uncertainty CO2: design a fuzzy logic control system for a continuous-time plant with single i/p-single o/p
CO3: compare the supervised and unsupervised learning techniques in artificial neural networks
CO4: explain the operation of genetic algorithm based optimization technique

Course Name: IoT Based Instrumentation System
Course Code: EI504C
Course Outcome:
After the completion of the course, the students will be
CO1: Able to understand the building blocks of IoT Technology.
CO2: Able to understand the application areas of IoT ·
CO3: Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO4: Able to use processors & peripherals to design & build IoT hardware.

Course Name:Industrial Instrumentation Lab
Course Code :EI 591
Course Outcomes:
CO1: Able to calibrate different instruments.
CO2: Able to measure different industrial parameter like pressure, temperature, flow,level etc.
CO3: Able to understand the working principle of different instruments. CO4: Able to choose the suitable instrument for desired measuring parameter.

Course Name: Analog & Digital Communication Lab
Course Code: EI 592
Course Outcome:
CO1: To learn signal and linear time invariant system properties.
CO2: Study, design, and build modulation systems examining trade-offs indifferent communication systems.
CO3: To be able to perform experiments in converting analog information into digital data via sampling, quantization, and coding.

CO4: To be able to choose necessary modulation technique for specific signal transmission.

Course Name: Control Engineering Laboratory
Course Code: EI 593
Course Outcome:
The students will be able to:
CO1.Apply formulate transfer function for given control system problems.
CO2.Demonstrate an understanding of the fundamentals of control systems.
CO3.Determine time response of given control system model.
CO4.Analyze the system behavior through Root Locus, Bode plots & Nyquist plot fora given control system model.

Course Name: Constitution of India
Course Code: MC501
Course Outcome:
Student will be able to:
CO1: Develop human values, create awareness about law ratification and significance of Constitution
CO2: Comprehend the Fundamental Rights and Fundamental Duties of the Indian Citizen to implant morality, social values and their social responsibilities.
CO3: Create understanding of their Surroundings, Society, Social problems and their suitable solutions.
CO4: Familiarize with distribution of powers and functions of Local Self Government. CO5: Realize the National Emergency, Financial Emergency and their impact on Economy of the country.

Course Name: Process Control-1
Course Code: EI601
Course Outcome:
Upon successful completion of the course students will be able to:
CO1: Design a controller by applying the knowledge of different control action
CO2: Calculate controller parameters by applying different tuning methods
CO3: Describe different advanced control strategy
CO4 : State the operation and use of final control element
CO5 : Develop ladder logic programs and understand basics of DCS

Course Name: Biomedical Instrumentation
Course Code: EI 602A
Course Outcome
After completion of this course, the students will be able to
CO1: Able to understand the detailed physiology of various human anatomical systems.
CO2: Able to identify proper transducer for acquisition of a particular bioelectric potential.
CO3: Able to analyse various biological conditions from the measured bioelectric potentials.
CO4: Able to design biotelemetry systems for acquiring bioelectric potentials from long distance.

Course Name: Advanced Sensors
Course Code: EI 602B
Course Outcome:
Students will be able to
CO1 Explain different techniques of sensors designing parameters.
CO2 Determine the specification of different types of sensors.

CO3 Understand and compare the different micro sensor development technique.
CO4 Design & Apply the micro sensors using different technique.

Course Name: Non Destructive Testing and Ultrasonic Instrumentation Course Code: EI602C
Course Outcome:
On the completion of this course, students will be able to
CO1.Understand the concept of non destructive testing
CO2.Describe the various types of NDT tests carried out on components
CO3.Analyze the different types of test carried out on components and surfaces.
CO4.Understand the properties of materials suitable for NDT.

Course Name: Analytical Instrumentation
Course Code: EI603A
Course Outcome:
After completion of the course, the students will be
CO1: able to determine the physical properties of samples like pH, viscosity, humidity and moisture.
CO2: able to quantitatively measure the composition of various gas and liquid samples.
CO3: able to identify the elements present in the given sample using analytical techniques.
CO4: able to apply and use chromatography in real time industrial environments.

Course Name: Non-Conventional Energy Sources
Course Code: EI603B
Course Outcome:
Student will be able to
CO1 Explain the different non-renewable sources.
CO2 Apply solar energy in different Field using photo voltaic cells.
CO3 Analyses the performance and testing of different energy resources.
CO4 Select the design parameters of the nonconventional energy plants.

Course Name: Artificial Intelligence
Course Code: EI 603C
Course Outcome
On completion of the course students will be able to
CO1: Understand the concepts of Artificial intelligence
CO2: Analyze the dimensions along which agents and environments vary, along with key functions that must be implemented in a general agent
CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing
CO4: Represent knowledge of the world using logic and infer new facts from that Knowledge andworking knowledge in PROLOG in order to write simple PROLOG programs and explore more sophisticated PROLOG code on their own.

Course Name: Power Electronics
Course Code: EI604A
Course Outcome:
CO1: Acquire knowledge about fundamental concepts and techniques used in power electronics.
CO2: Ability to express characteristics of SCR, BJT, MOSFET and IGBT. CO3: Ability to analyze& design of various single phase and three phase power converter, inverters

circuits and understand their applications.
CO4: To develop skills to build, and troubleshoot power electronics circuits like SMPS, Intelligent power module, etc's.

Course Name: Industrial Drives
Course Code: EI604B
Course Outcome
CO1: Demonstrate the basic requirements of dc drive and ac drive.
CO2: Illustrate the principles of speed-control of dc motors and ac motors.
CO3: Classify the industrial applications of dc drive and ac drive.

Course Name: ROBOTICS ENGINEERING
Course Code: EI604C
Course Outcome
CO1: Perform kinematic and dynamic analyses with simulation. Designcontrol laws for a simple robot.
CO2: Integrate mechanical and electrical hardware for a real prototype of robotic device.
CO3:Select a robotic system for given industrial application.
CO4: Use of robots in domestic applications.

Course Name: Data Structures & Algorithms
Course Code: EI605A
Course Outcomes:
On completion of the course students will be able to
CO1. Differentiate how the choices of data structure & algorithm methods impact the performance of program.
CO2. Solve problems based upon different data structure & also write programs. CO3. Identify appropriate data structure & algorithmic methods in solving problem. CO4. Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing
CO5. Compare and contrast the benefits of dynamic and static data structures implementations.

Course Name: Database Management System
Course Code: EI605B
Course Outcomes (COs)
On completion of the course students will be able to
CO1: Apply the knowledge ofEntityRelationship (E-R)diagramforanapplication. CO2: Create a normalized relational database model
CO3: Analyze real world queries to generate reports from it.
CO4: Determine whether the transaction satisfies the ACID properties.
CO5: Create and maintain the database of an organization.

Course Name: Software Engineering
Course Code: EI605C
Course Outcomes:
CO1: To identify, formulate, and solve software engineering problems, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements
CO2: To analyze,elicit and specify software requirements through a productive working relationship with various stakeholders of the project

CO3: To design applicable solutions in one or more application domains using software engineering approaches that integrates ethical, social, legal and economic concerns. CO4: To develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.
CO5: To identify modern engineering tools necessary for software project management, time management and software reuse, and an ability to engage in life-long learning.

Course Name: Process Control Laboratory
Course Code : EI691
Course Outcome:
After completion of the laboratory course students will be able to:
CO1: Recognize & explain basic process control loop elements via hands on experiment.
CO2: Control different process variable (flow, pressure, level & temperature) using different controller mode.
CO3:Use various PLC functions and develop PLC programs to control a real time system.
CO4:Control& monitor different process variable through DCS.

Course Name:Power Electronics Laboratory
Course Code : EI 692A
At the end of the course, a student will be able to:
CO1 :Identify relevant information to supplement to the Power Electronics course & set up testing strategies and select proper instruments to evaluate performance characteristics of Power devices and power electronics circuits and analyze their operation under different loading conditions.
CO2: Realize the limitations of computer simulations for verification of circuit behavior, apply these techniques to different power electronic circuits and evaluate possible causes of discrepancy in practical experimental observations in comparison to theory. CO3: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software,and word-processing tools.
CO4: Primarily via team-base laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.

Course Name:INDUSTRIAL DRIVES LABORATORY
Course Code :EI692B
Course Outcome:
At the end of this course, students will be able to:
CO1. Test DC and AC motor drive.
CO2. Perform tests on transformers.
CO3. Perform the test on Induction motors.

Course Name:Robotics Engineering Lab
Course Code : EI692C
Course Outcome:
The students will be able to:
CO1.Apply formulate transfer function for given control system problems.
CO2.Demonstrate an understanding of the fundamentals of control systems.
CO3.Determine time response of given control system model.
CO4.Analyze the system behavior through Root Locus, Bode plots & Nyquist plot fora given control system model.

Course Name: Data Structures & Algorithms Lab
Course Code: EI693A
Course Outcomes:
CO1. Choose appropriate data structure as applied to specified problem definition. CO2. Handle operations like searching, insertion, deletion, traversing mechanism on various data structures.
CO3. Have practical knowledge on the applications of data structures.
CO4. Able to store, manipulate and arrange data in an efficient manner. CO5. Able to implement queue and stack using arrays and linked list. Implementation of queue, binary tree and binary search tree.

Course Name: DATABASE MANAGEMENT SYSTEM LAB
Course Code: EI693B
Course Outcomes:
On completion of the course students will be able to
CO1: Understand the basic concepts regarding database, know about query processing and techniques involved in query optimization and understand the concepts of database transaction and related database facilities including concurrency control, backup and recovery. CO2: Understand the introductory concepts of some advanced topics in data management like distributed databases, data warehousing, deductive databases and be aware of some advanced databases like partial multimedia and mobile databases.
CO3: Differentiate between DBMS and advanced DBMS and use of advanced database concepts and become proficient in creating database queries.
CO4: Analyze database system concepts and apply normalization to the database. CO5: Apply and create different transaction processing and concurrency control applications.

Course Name: Software Engineering Lab
Course Code: EI693C
Course Outcomes:
CO1: To handle software development models through rational method. **CO2:** To prepare SRS document, design document, test cases and software configuration management and risk management related document.
CO3: To develop function oriented and object oriented software design using tools like rational rose.
CO4: To perform unit testing and integration testing
CO5: To apply various white box and black box testing techniques

Course Name: Values and Ethics in Profession
Course Code: HU 701
Course Outcome:
On Completion of this course student will be able to
CO1. Understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.
CO2. Understand the basic perception of profession, professional ethics, various moral issues
CO3. Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field
CO4. Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.
CO5. Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their

professional lives.

Telemetry & Remote Control
Code: EI701
Course Outcome:
Students will be able to
CO1: Understand the concepts and purpose of different Telemetry & Remote control systems in Instrumentation field. Identify the concepts and utilities of telemetry systems

CO2: Recognize the various Telemetry systems, coding, modulation techniques and Time Division Multiplexing and Frequency Division Multiplexing techniques and MODEM and concept of Wave propagation

CO3: Understand the concepts and applications of satellite Telemetry

CO4 : Design and implement the Remote control system for various Industrial application purposes and the guidelines for solving different industry related complex problems

PROCESS CONTROL- II
Code: EI 702
Course Outcome:

After the completion of the course, learner will be able to:
CO1: perform the discretization and reconstruction of a given signal and carry out z-transform and inverse z-transform for given functions
CO2: carry out mathematical modeling, stability analysis and time response analysis of a linear time-invariant discrete-time control system
CO3: design digital PID controller and deadbeat controller for linear time-invariant single i/p single o/p system and compare the fuzzy logic control system with a conventional control system
CO4: explain the functionality of DCS in a process plant, including control, communication, protocols and network topology

Power Plant Instrumentation
Code: EI702B
Course Outcome:
Upon completion of this course, the students will be able to
CO1: understand the operational functions of building blocks of different Power plant systems. CO2: analyze the Boiler-Turbine unit operation with the instrumentation system. CO3: demonstrate the measurement process in the Boiler-Turbine unit. CO4: analyze the control operations in different types of plants and understand the data handling system.

Plant Automation
Code: EI 702C

Course Outcome:
Upon completion of this course, the student will be able to
CO1: understand the operational functions of PLC, DCS and SCADA.
CO2: analyze Industrial Networking, Networking protocols and Topologies. CO3: demonstrate the competence in maintaining and troubleshooting technology, detecting more serious problems, generating workable solutions to correct deviations and recognizing when to get additional help.
CO4: analyze the automation technologies in different types of plants.

Computer Networking
Code: EI703A
Course Outcome:
After completion of the course students will be able to
CO1: Understand Basic introduction of Computer Network along with Physical layer of OSI and TCP/IP model.
CO2: Analyze Datalink layer protocols with MAC and LAN technologies.
CO3: Design applications using internet protocols, routing and UDP,TCP.
CO4: Develop application layer protocols and understand socket programming

Computer Graphics and Multimedia
Code: EI703B
Course Outcome:

After completion of this course student will be able to

CO1: Design and apply two dimensional graphics and transformations. CO2:

Design and apply three dimensional graphics and transformations. CO3: Apply

Illumination, color models and clipping techniques to graphics. CO4: Understood

Different types of Multimedia File Format.

Object Oriented Programming
Course Code: EI703C
Course Outcomes:

CO1: Design the process of interaction between Objects, classes & methods w.r.t.Object Oriented Programming.
CO2: Acquire a basic knowledge of Object Orientation with different properties as well as different features of Java.
CO3: Analyze various activities of different string handling functions with various I/O operations.
CO4: Discuss Inheritance, Package, Interface, Exception handling, Multithreading and Applet (Web programs in java) concepts in Java.

TELEMETRY AND REMOTE CONTROL LAB
CODE: EI 791
Course Outcome:

After completion of the laboratory course students will be able to:

CO1: Recognize and explain basic computational properties of remote sensing data acquisition, storage, and processing.
CO2: Apply mathematical relationships describing fundamental physical, geometric, and computational principles relevant to remote sensing.
CO3: Recognize and explain at a basic level fundamental physical principle of remote sensing. CO4: Demonstrate proficiency and conceptual understanding in using software or manual techniques to carry out remote sensing image processing and analysis through a series of laboratory exercises and reports.

Computer Networking Lab
Paper Code: EI792A
Course Outcome:

CO1: Installation of different Network devices, simulators, hardware connection using cables and other tools.
CO2: Demonstrate TCP & UDP using socket program.
CO3: Develop the code for Data link layer protocol simulation.
CO4: Examine the performances of Routing protocol with congestion control algorithm using network simulator

Multimedia Lab
Paper Code: EI792B
Course Outcome:

After completion of this course student will be able to

CO1: Create 3D graphical scenes using open graphics library suits

CO2: Analyze the effects of scale and use on both presentation and lower level requirement

CO3: Develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications surrounding the emergence of multimedia technology.

CO4: Implement image manipulation, enhancement, and basic transformations on objects and clipping algorithm on lines

Object Oriented Programming Lab
Course Code: EI792C
Course Outcome:

CO1: Create the procedure of communication between Objects, classes & methods. CO2: Understand the elementary facts of Object Orientation with various characteristics as well as several aspects of Java.
CO3: Analyze distinct features of different string handling functions with various I/O operations.
CO4: Discuss Inheritance, Package, Interface, Exception handling, Multithreading and Applet (Web program in java) pro

Principles of Management

Code: HU 804

Course outcome:

On completion of the course students will be able to
CO1: To recall and identify the relevance of management concepts.

CO2: To apply management techniques for meeting current and future managementchallenges faced by the organization

CO3: To compare the management theories and models critically to solve real life problems in an organisation.
CO4: To apply principles of management in order to execute the role as a manager in an organisation.

Virtual Instrumentation
Code: EI 801A
Course Outcome:

After the successful completion of the course the students will be able to: CO1: To explain the working of LabVIEW.
CO2: To Understand the various types of structures used in LabVIEW.
CO3: To analyze and design different type of programs based on data acquisition. CO4: To apply the knowledge of LabVIEW for signal processing, image processing etc.

Embedded System Design
Code: EI801B
Course Outcome:
After completion of the course, the students will be able to
CO1: Understand the architecture and classifications of different embedded systems and the related programming knowledge.
CO2: Understand the concepts of embedded systems like I/O, timers, interrupts, interaction with peripheral devices
CO3: Choose case-specific debugging technique for an embedded system. CO4: Design various real time systems using embedded systems.

Mechatronics
Code: EI801C
Course Outcome:

1. Mechatronics graduate will be able to employ the knowledge of mathematics, science, and engineering.
2: Able to Design mechatronics component, system or process to meet desired needs.
3. Define and solve engineering problems.
4. Use the techniques, skills, and modern mechatronics engineering tools necessary for engineering practice.

Mobile Communication
Code: EI802A
Course Outcome:

CO1: By the end of the course, the student will be able to analyze and design wireless and mobile cellular systems.
CO2: By the end of the course, the student will have the ability to work in advanced research wireless and mobile cellular programs.
CO3: By the end of the course, the student will be able to realize all the applications of wireless protocols
CO4: By the end of the course, the student will be able to design the mobile networks.

VLSI & Microelectronics
Code:EI802B
Course Outcome:

The Students will be able to

CO1: Understand scale of integration and VLSI design flow and VLSI Design steps.

CO2: Calculate and analyze the different parameters related to the different MOS devices and to design the combinational and sequential logic circuits.

CO3: Describe fabrication steps of IC and construct stick diagram & layout of CMOS inverter and basic gates based on Layout design rules.

CO4: Understand the VHDL basics and to construct the combinational and sequential logic circuits**.**

Quantum Computing
Code: EI802 C
Course Outcome:
After successful completion of the course, students will be able to
CO1: explain the basics of quantum computation
CO2: solve different quantum circuits
CO3: describe quantum Information and cryptography protocols
CO4: write quantum algorithms

Virtual Instrumentation Lab

Course Code: EI 891A
Course Outcome:
On completion of this course students will be able to:
CO1: operate LabVIEW software.
CO2: explore the various programming techniques of LabVIEW software **CO3:** design different type of program based on data acquisition systems and control systems **CO4:** apply knowledge of VI into different real time applications,

Embedded Systems Design Lab
Code: EI 891B
Course Outcomes:

CO1. Familiarization with PIC Microcontroller, ARM Microcontroller, FPGA and their interfacing.
CO2. Design of different types real time projects with digital controllers.
CO3. Program ARM microcontroller to perform various tasks.
CO4. Understand the key concepts of embedded systems such as I/O, timers, interrupts and
interaction with peripheral devices.

MECHATRONICS Lab
CODE: EI 891C
Course Outcome:

1. Mechatronics graduate will be able to employ the knowledge of mathematics, science, and engineering.
2: Able to Design mechatronics component, system or process to meet desired needs.
3. Define and solve engineering problems.
4. Use the techniques, skills, and modern mechatronics engineering tools necessary for engineering practice.