



MEENAKSHI COLLEGE OF ENGINEERING

NO-12, Vembuli Amman Kovil Street, West K.K.Nagar ,
Chennai – 600078.

ELECTRONICS AND INSTRUMENTATION ENGINEERING REGULATION -2017

COURSE OUTCOMES SEMESTER I

COMMUNICATIVE ENGLISH – I (HS8151)

CO1	Utilize suitable language in professional settings.
CO2	Develop a strong understanding of essential grammatical structures and effectively utilize them in diverse contexts.
CO3	Interact with technical texts to uncover both their apparent and hidden significances, comprehensively exploring not just their technical complexities but also their nuanced interpretations.
CO4	Examine and interpret data presented in tables, charts, and other visual formats.
CO5	Compose definitions, descriptions, narratives, and essays covering a wide range of topics

ENGINEERING MATHEMATICS(MA8151)

CO1	Diagonalizing symmetric matrices and analogous matrices involves utilizing eigenvalues and eigenvectors.
CO2	Gradients, potential functions, and directional derivatives pertain to the study of functions that involve multiple variables.
CO3	Calculate line, surface, and volume integrals utilizing Gauss's divergence theorem, Green's theorem, and Stokes's theorem.
CO4	Discuss analytic functions in heat and fluid flow.
CO5	Extend the concept of contour integrals in evaluating Real integrals.

ENGINEERING PHYSICS (PH8151)

CO1	Gain knowledge on the basics of properties of matter and its applications.
CO2	Acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
CO3	Understand the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
CO4	Gain knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes.
CO5	Understand the basics of crystals, their structures and different crystal growth techniques

ENGINEERING CHEMISTRY (CY8151)

CO1	Make the students conversant with boiler feed water requirements, related problems and water treatment techniques
CO2	Develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys
CO3	Preparation, properties and applications of engineering materials
CO4	Analyse the types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels
CO5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells

PROBLEM SOLVING AND PYTHON PROGRAMMING (GE8151)

CO1	Develop algorithmic solutions to simple computational problems
CO2	Develop and execute simple Python programs
CO3	Write simple Python programs using conditionals and loops for solving problems
CO4	Decompose a Python program into functions
CO5	Represent compound data using Python lists, tuples, dictionaries etc
CO6	Apply python programs to read and write data from/to files.

ENGINEERING GRAPHICS (GE8152)

CO1	Discuss about conics and orthographic views of engineering components
CO2	Draw the projection of points, lines and planes
CO3	Classify solids and projection of solids at different positions
CO4	Show sectioned view of solids and development of surface
CO5	Draw isometric projection and perspective views of an object/solid
CO6	Apply the concept of drawing in practical applications

PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY (GE8161)

CO1	Write, test, and debug simple Python programs.
CO2	Apply the concept of conditionals and loops in Python programs.
CO3	Develop the Python programs step-wise by defining functions and calling them.
CO4	Use Python lists, tuples, dictionaries for representing compound data.

CO5	Read and write data from/to files in Python.
CO6	Apply the concept of Pygame.
CO7	Exhibit ethical principles in engineering practices
CO8	Perform task as an individual and / or team member to manage the task in time

PHYSICS AND CHEMISTRY LABORATORY (BS8161)

PHYSICS LABORATORY	
CO1	Determine the Modulus of elasticity of materials and Coefficient of Viscosity of liquids
CO2	Determine the Thermal Conductivity of bad conductor using Lee's disc method
CO3	Calculate the Compressibility of liquids and velocity of ultrasonic waves in liquids
CO4	Measure the wavelength of prominent spectral lines of Mercury Spectrum and particle size of powder using diffraction phenomenon and thickness of thin materials using interference phenomenon,
CO5	Determine the band gap energy of a semiconductor
CO6	Calculate water quality parameters such as hardness, alkalinity of the given water sample.
CO7	Estimate the amount of the given acids using conductometric titrations.
CO8	Estimate the amount of the given acids using pH titrations
CO9	Determine the amount of iron content in the given substance using potentiometric titration
CO10	Determine the amount of chloride content in the given water sample.
CO11	Exhibit ethical principles in engineering practices
CO12	Perform task as an individual and / or team member to manage the task in time
CO13	Express the Engineering activities with effective presentation and report.
CO14	Interpret the findings with appropriate technological / research citation.

SEMESTER II

TECHNICAL ENGLISH (HS8251)

CO1	Read technical texts proficiently and compose specialized texts within a given area effortlessly.
CO2	Successfully comprehend and internalize lectures and discussions within their specialized field.
CO3	Communicate appropriately and effectively in a variety of formal and informal situations.
CO4	Enhance the skill to clearly and effectively communicate technical information using both
CO5	Compose reports and craft compelling job applications that stand out and increase the likelihood

ENGINEERING MATHEMATICS II (MA8251)

CO1	Calculate the eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices C110.2 Evaluate the line, surface and volume integrals using
CO2	Evaluate the line, surface and volume integrals using Gauss, Stokes and Green's theorems and their
CO3	Determine Analytic functions, conformal mapping and Bilinear transformation.
CO4	Evaluate the Cauchy's integrals, Taylor's and Laurent's and residue theorem for evaluation for real integrals using circular and semicircular, contour
CO5	Evaluate Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

PHYSICS FOR ELECTRONICS ENGINEERING (PH8253)

CO1	Discuss about Wiedemann Franz law and the conduction in solids.
CO2	Associate the concept of quantum electron theories with energy band structures.
CO3	Discuss the carrier concentration in semiconducting materials.
CO4	Explain the origin of magnetism and the properties of magnetic materials.
CO5	Discuss the working of Opto-electronic devices.
CO6	Summarize the basics of quantum structures and their applications in a

BASIC CIVIL AND MECHANICAL ENGINEERING (BE8252)

CO1	State the scope of civil Engineering and Overview of Civil Engineering and Explain the scope of Mechanical Engineering and Overview of Mechanical Engineering
CO2	State the functions of IC engine and differentiate the working principle of 2stroke, 4 stroke petrol and diesel engine, Types of power plant and classify the various types of boilers and conclude the use of boiler in power plant.
CO3	Apply the principles of vapour absorption and compression systems and Explain the operation and type air conditioner
CO4	Apply the principles of surveying and use various measurements for surveying and Explain about various engineering materials and leveling instruments.
CO5	Classify the types of bridges, foundation, floorings, roofs, plasters and R.C.C structural members and state the purpose of dam.
CO6	Explain the working of different types of Analog Instruments and transducers

ENVIRONMENTAL SCIENCE AND ENGINEERING (GE8291)

CO1	Summarize the values, threats, conservation of biodiversity and ecosystems
CO2	Discuss the sources, effects, control measures of different types of pollution, and solid waste management
CO3	Associate the effects of exploitation of Natural resources on environment
CO4	Summarize the water conservation methods and various environmental acts for environmental sustainability
CO5	Explain the effect of Human population and role of IT in environment and human health
CO6	Discuss scientific, technological, economic and social solutions to environmental problems

CIRCUIT THEORY (EE8251)

CO1	Apply Kirchhoff's current and voltage laws to simple circuits and Solve complex circuits using Mesh & Nodal Methods.
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CO2	Apply Network theorems to linear circuits and to solve simple and complex problems.
CO3	Analyze the Transient response of RLC circuits under DC and AC excitation using Laplace
CO4	Analyze three phase balanced and unbalanced star, delta network
CO5	Compute the frequency response of Series and Parallel resonance and analyze tuned circuits

ENGINEERING PRACTICES LABORATORY (GE8261)

CO1	Demonstrate wiring for a simple residential house; identify the ratings of various appliances like fluorescent tube
CO2	Calculate the different electrical quantities
CO3	Measure the resistance to earth of electrical equipment
CO4	Verify the truth tables of logic gates AND
CO5	Develop soldering in a PCB

ELECTRIC CIRCUITS LABORATORY (EE8261)

CO1	Apply Kirchhoff's voltage and current laws to solve simple and complex circuits
CO2	Apply network theorems to solve simple and complex circuits.
CO3	Demonstrate the working of Analog and digital storage oscilloscopes.
CO4	Determine frequency response of RLC circuits and Use MATLAB to simulate series, parallel resonant
CO5	Apply MATLAB tool to simulate three phase balanced and unbalanced star, delta network circuit.

SEMESTER III

TRANSFORM PARTIAL DIFFERENTIAL EQUATIONS (MA8353)

CO1	Learn the methods for solving standard partial differential equations.
CO2	Utilize Fourier series analysis for solving differential equations, an essential method in engineering contexts.
CO3	Understand the practical importance of Fourier series methods in addressing one- and two-dimensional heat conduction problems as well as one-dimensional wave equations.
CO4	Understanding the mathematical principles of transforms and partial differential equations enables individuals to formulate and solve a variety of engineering-related physical problems.
CO5	Utilize effective mathematical tools to solve partial differential equations through the application of Z-transform techniques for discrete-time systems.

ELECTRON DEVICES AND CIRCUITS (EC8353)

CO1	Explain the Structure of basic electronic devices and its characteristics
CO2	Construction and working of various active and passive devices like MOSFET, UJT,BJT,JFET
CO3	Analysis of BJT in various modes of operation in gain and frequency response and small signal amplifier circuits
CO4	Demonstrate the different stages of amplifier, differential amplifier cascade amplifier, power amplifier
CO5	Explain the functions of various oscillator circuits and positive and negative feedback circuits

DIGITAL LOGIC CIRCUITS (EE8351)

CO1	Convert various number systems ; simplify the logical expressions using Boolean functions and compare Digital logic families
CO2	Design of combinational logic circuits ,multiplexer, demultiplexer and code converters.
CO3	Design a Synchronous Sequential Circuits
CO4	Analyze and design the asynchronous sequential circuit and PLDs
CO5	Develop the VHDL coding for Combinational logic and Sequential circuits and digital Simulation for development application oriented logic circuits

ELECTRICAL MEASUREMENTS (EI8351)

CO1	Summarize the Magnetic materials used in Magnetic Circuits
CO2	Demonstrate the operation of Transformer
CO3	Explain the Electromechanically Energy Conversion
CO4	Outline the operation of DC Generators
CO5	Outline the operation of DC Motors

TRANSDUCERS ENGINEERING (EI8352)

CO1	Get to know the methods of measurement, classification of transducers and to analyze error.
CO2	To understand the behavior of transducers under static and dynamic conditions and hence to model the
CO3	Get exposed to different types of resistive transducers and their application areas.
CO4	To acquire knowledge on capacitive and inductive transducers.
CO5	To gain knowledge on variety of transducers and get introduced to MEMS and Smart transducers.

OBJECT ORIENTED PROGRAMMING (CS8392)

CO1	Interpret Java programs using Object Oriented Programming principles
CO2	Explain Java programs with the concepts inheritance and interfaces
CO3	Contrast Java applications using exceptions and I/O streams
CO4	Relate Java applications with threads and generics classes
CO5	Develop interactive Java programs using swings
CO6	Demonstrate simple Graphical User Interfaces

MEASUREMENTS AND TRANSDUCERS LABORATORY (EI8361)

CO1	Understand the concepts of measurement, error and uncertainty.
CO2	Understand the static and dynamic characteristics of measuring instruments.
CO3	Gain knowledge about the principle of operation and characteristics of different types of resistance, capacitance
CO4	Acquire knowledge of analyzing different stages of signal conditioning units.
CO5	Ability to interpret the results and draw meaningful conclusions.
CO6	Ability to work as a member of a team while carrying out experiments.

OBJECT ORIENTED PROGRAMMING LABORATORY (CS8383)

CO1	Ability to understand and implementation of Boolean functions
CO2	Ability to understand the importance of code conversion
CO3	Ability to design and implement 4 bit shift register
CO4	Ability to acquire knowledge on applications of op.amp
CO5	Ability to design and implement counters using specific counter IC

SEMESTER IV

NUMERICAL METHODS (MA8491)

CO1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
CO2	Appreciate the numerical techniques of interpolation and error approximations in various Intervals in real life situations.
CO3	Apply the numerical techniques of differentiation and integration for engineering problems.
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

ELECTRICAL MACHINES (EI8451)

CO1	Ability to acquire knowledge to solve problems associated with DC and AC Machines.
CO2	Ability to test and control different machines based on the familiarity of basic concepts and working principle.
CO3	Ability to choose appropriate machines for a given application while carrying out projects.
CO4	Ability to apply the knowledge gained to choose appropriate machines for specific application useful for the society.
CO5	Ability to know about the latest developments related to machines and to learn their concepts even after the completion of the course.
CO6	Ability to acquire knowledge of stepper motor.

INDUSTRIAL INSTRUMENTATION-I (EI8452)

CO1	Ability to understand the construction and working of instruments used for measurement of force ,torque, speed, acceleration, vibration, density ,viscosity, humidity, moisture ,temperature.
CO2	Ability to select instruments according to the application
CO3	Ability to understand the concept of calibration of instruments and gain knowledge about temperature
CO4	Ability to design signal conditioning circuits and compensation schemes for temperature measuring
CO5	Ability to understand the working of instruments used for measurement of pressure.

LINEAR AND INTEGRATED CIRCUIT APPLICATIONS (EE8451)

CO1	Ability to acquire knowledge in IC fabrication procedure
CO2	Ability to analyze the characteristics of Op-Amp
CO3	To understand the importance of Signal analysis using Op-amp based circuits.
CO4	Functional blocks and the applications of special ICs like Timers,,PLL circuits,,regulator Circuits.
CO5	To understand and acquire knowledge on the Applications of Op-amp

CONTROL SYSTEMS (IC8451)

CO1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
CO2	Ability to do time domain and frequency domain analysis of various models of linear system.
CO3	Ability to interpret characteristics of the system to develop mathematical model
CO4	Ability to design appropriate compensator for the given specifications
CO5	Ability to come out with solution for complex control problem.
CO6	Ability to understand use of PID controller in closed loop system

COMMUNICATION ENGINEERING (EC8395)

CO1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
CO2	Apply analog communication techniques
CO3	Apply digital communication techniques
CO4	Use data and pulse communication techniques.
CO5	Analyze Source and Error control coding.

DEVICES AND MACHINE LABORATORY (EI8461)

CO1	Gain knowledge on the proper usage of various electronic equipment and simulation tools
CO2	Get hands-on experience in studying the characteristics of semiconductor devices
CO3	Ability to analyze various electronic circuits such as voltage regulators, transistor amplifiers and oscillators.
CO4	Ability to make use of basic concepts to obtain the no load and load characteristics of D.C machines.
CO5	Analyze and draw conclusion from the characteristics obtained by conducting experiments on machines

LINEAR AND INTEGRATED CIRCUIT LABORATORY (EE8461)

CO1	Ability to understand and implementation of Boolean functions
CO2	Ability to understand the importance of code conversion
CO3	Ability to design and implement 4 bit shift register
CO4	Ability to acquire knowledge on applications of op.amp
CO5	Ability to design and implement counters using specific counter IC

SEMESTER V

ANALYTICAL INSTRUMENTS (EI8551)

CO1	Outline the principles of various spectrometric techniques
CO2	Illustrate the basic principles of general instrumentation and calibration
CO3	Outline the NMR and Mass Spectrometry
CO4	Explain the various types of Techniques are used for separation
CO5	Outline about radioisotope techniques and instrumentation

INDUSTRIAL INSTRUMENTATION-II (EI8552)

CO1	Ability to understand the construction, installation and working of different variable head type flow meters.
CO2	Able to understand the construction, working and calibration of different quantity flow meters, variable area flow meters, mass flow meters, electrical type, open channel and solid flow meters.
CO3	Ability to gain knowledge about the construction, working and calibration of different type of transmitters.
CO4	Ability to choose appropriate flow meters or level sensor for an application.

PROCESS CONTROL (EI8553)

CO1	Learn the classification and modeling of various industrial processes.
CO2	Explore the various process control and their applications in different industrial processes.
CO3	Understand the application advanced control concepts to different industrial processes.
CO4	Learn the application of DCS, Fuzzy and intelligent controllers in advance process control.
CO5	Have core competency of conventional and intelligent controllers used in industries

MICROPROCESSORS AND MICROCONTROLLERS (EE8551)

CO1	Describe the basic Architecture of 8085Microprocessor and working of all blocks of the processor, IO and memory interfacing with necessary timing diagrams.
CO2	Classify the instructions with the help of Addressing modes of 8085 with necessary programs
CO3	Explain the basic Architectureof8051 Microcontroller with working of various blocks of the
CO4	Illustrate how the different peripherals are interfaced with Microprocessor & Microcontroller
CO5	Apply the knowledge of programming concepts of 8051Microcontroller for various applications like keyboard display interface, servo motor etc.,

DIGITAL SIGNAL PROCESSING (EE8591)

CO1	Classify the different types of Signals and Systems
CO2	Explain the LTI systems with different inputs using Z transform
CO3	Apply DFT& FFT for the analysis of digital signals
CO4	Develop IIR filters from analog filters and build FIR filters using windows and sampling technique
CO5	Classify the DSP Processor and its architecture for different applications

AIR POLLUTION AND CONTROL ENGINEERING (OCE551)

CO1	Learn the types of pollution and their effects on living organisms.
CO2	Analyze how the pollution affects economy of a country.
CO3	Interpret the harmful effects of air, water, noise pollution and rules set up for their control
CO4	Understand Industrial pollutants and their treatment mechanism as per the Indian Standards
CO5	Examine types of pollution control used in various industries

MICROPROCESSOR AND MICROCONTROLLER LAB (EE8681)

CO1	Design a program for arithmetic cooperation ,Ascending/ Descending order ,finding
CO2	Identify and convert Analog to Digital, Digital to Analog numbers and implement the traffic light controller with 8085
CO3	Design a code to display the given words using keyboard display controller for serial communication
CO4	Analyze a program using read key to interface with display units and demonstrate conditional jumps
CO5	Create program using I/O port,8051timer , A/D&D/A interface with DC &AC motors and develop a
CO6	Exhibit ethical principles in engineering practices
CO7	Perform task as an individual and /or team member to manage the task in time
CO8	Express the Engineering activities with effective presentation and report.
CO9	Interpret the findings with appropriate technological/research citation.

INDUSTRIAL INSTRUMENTATION LABORATORY (EI8561)

CO1	Ability to experimentally measure industrial process parameters such as flow, level, temperature, pressure and viscosity
CO2	Ability to measure and analyze pH, conductivity, UV absorbance and transmittance.
CO3	Ability to measure and analyze physiological parameters such as BP, ECG and pulse rate.

SEMESTER VI

LOGIC AND DISTRIBUTED CONTROL SYSTEMS (EI8651)

CO1	Ability to understand all the important components such as PLC, SCADA, DCS, I/O modules and field devices of an industrial automation system.
CO2	Ability to develop PLC program in different languages for industrial sequential applications.
CO3	Able to select and use most appropriate automation technologies for a given application.
CO4	Ability to gain knowledge on the recent developments in industrial automation

COMPUTER CONTROL OF PROCESS (EI8691)

CO1	Ability to analyze the discrete time systems
CO2	Ability to build models from input-output data
CO3	Ability to design a digital controller
CO4	Ability to design multi-loop controller for multi-variable systems.
CO5	Ability to design multivariable controller for multi-variable systems.

DATA STRUCTURES (CS8391)

CO1	Implement abstract data types for linear data structures.
CO2	Apply the different linear data structures to problem solutions
CO3	Apply the different non-linear data structures to problem solutions
CO4	Critically analyze the various sorting algorithms.

ELECTRONICS INSTRUMENTATION (EI8692)

CO1	Understand various types of electronic instruments
CO2	Understand about cathode ray oscilloscope and signal analyzer
CO3	Understand about types of oscillators and generators

CO4	Understand about architecture of virtual instruments and software in virtual
CO5	Understand about telemetry systems

ADAPTIVE CONTROL (EI8071)

CO1	Understand the effect of parameter variation and principle of adaptive control Schemes.
CO2	Distinguish different parametric identification methods
CO3	Understand deterministic and stochastic self tuning regulators.
CO4	Design of model reference adaptive controller
CO5	Design gain scheduling controller and apply adaptive control schemes for industrial processes.

ADVANCED INSTRUMENTATION SYSTEMS (EI8072)

CO1	Understand the instrumentation behind flow,level,temperature and pressure measurement
CO2	Acquire basic knowledge on the various types of analyzers used in typical industries.
CO3	Understand the role of Safety instrumented system in the industry.
CO4	Explain Standards for applying Instrumentation in Hazards Locations.
CO5	Design, develop, and interpret the documents used to define instruments and Control
CO6	Systems for a typical project, including P&IDs, loop diagrams, specification forms,

DATA STRCUTURES LABORATORY (EI8071)

CO1	Write functions to implement linear and non-linear data structure operations
CO2	Suggest appropriate non-linear data structure operations for solving a given problem
CO3	Suggest appropriate linear data structure operations for solving a given problem
CO4	Appropriately use the linear/ non-linear data structure operations for a given problem
CO5	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

PROCESS CONTROL LABORATORY (EI8661)

CO1	Ability to understand and analyze process control engineering problems
CO2	Be able to build dynamic model using input–output data of a process
CO3	Ability to working with real time control loops(flow/level/temperature/pressure)
CO4	Get exposed to simulation tools such as MATLAB/LABVIEW/ASPEN
CO5	Ability to learn and implement simple adaptive and model based control schemes

PROFESSIONAL COMMUNICATION (HS8581)

CO1	Make effective presentations
CO2	Participate confidently in Group Discussions.
CO3	Attend job interviews and be successful in them.
CO4	Develop adequate Soft Skills required for the workplace

SEMESTER VII

INDUSTRIAL DATA NETWORKS (EI8751)

CO1	Understand the basic concepts of data communications including the key aspects of
CO2	Understand switching techniques, physical structures
CO3	Understand the various buses in industrial networks using HART and FIELBUS
CO4	Understand the various buses in industrial networks using Profibus and Modbus
CO5	Understand various Ethernet Protocols

EMBEDDED SYSTEMS (EE8691)

CO1	Outline the basic build process of embedded systems, structural units in embedded processor.
CO2	Explain the different types of I/O device ports, buses and different interfaces for data transfer in embedded networking.

CO3	Demonstrate the different techniques like state machine model, sequential program model and
CO4	Explain the basic concept of Real Time Operating Systems and scheduling of different task and compare the features of different types Of Real Time Operating Systems
CO5	Summarize the concepts of Embedded systems in real time applications

DIGITAL IMAGE PROCESSING (EC8093)

CO1	Classify the different types of Signals and Systems
CO2	Explain the LTI systems with different inputs using Z transform
CO3	Apply DFT& FFT for the analysis of digital signals
CO4	Develop IIR filters from analog filters and build FIR filters using windows and sampling technique
CO5	Classify the DSP Processor and its architecture for different applications

FIBER OPTICS & LASER INSTRUMENTATION (EI8075)

CO1	Understand fundamental properties of light and basics of optical components.
CO2	Understand the different applications of laser and fiber optics.
CO3	Analysis the characteristics, design architectures and trade-offs of semiconductor lasers.
CO4	Design architectures and trade-offs of optical detectors and modulators of light.
CO5	Understand basic fundamental theory of fiber optics and holography.

THERMAL POWER PLANT INSTRUMENTATION (EI8092)

CO1	Knowledge of Non-conventional energy sources especially solar and Wind
CO2	Study of various energy conversion techniques in solar and wind energy.
CO3	Environment and Economical Benefits and challenges with solar and Wind power generation
CO4	Study of wind and solar energy generation scenario in India and world
CO5	Study of the grid compatibility and integration issues of wind and solar power plants.

INDUSTRIAL SAFETY (OME754)

CO1	Understand the basic aspects of industrial safety
CO2	Analyze the basic principles of machine guarding.
CO3	Comprehend the knowledge of safety in welding and gas cutting.
CO4	Apply various analytical techniques of safety measurements
CO5	Study the safety standards of boilers in India.

INDUSTRIAL AUTOMATION LABORATORY (EI8761)

CO1	Ability to understand design of signal conditioning circuits and instrumentation systems.
CO2	Ability to design controller, control valve and transmitter.
CO3	Be able to design and draw the piping diagram for industrial application projects.
CO4	Be able to design the multi-channel data acquisition system and transmitter

INSTRUMENT SYSTEM DESIGN LABORATORY (EI8762)

CO1	Obtain adequate knowledge in design of various signal conditioning circuits and instrumentation
CO2	Impart design knowledge of controller, control valve and transmitter.
CO3	Acquire the knowledge of piping diagram of industrial standard
CO4	Make the students aware of industry project, planning and scheduling.

SEMESTER VIII

ROBOTICS AND AUTOMATION (EI8079)

CO1	Understand the evolution of robot technology
CO2	Understand the different types of robot
CO3	Understand the manipulators and grippers
CO4	Understand about design of robot machine interface

PROFESSIONAL ETHICS IN ENGINEERING (GE8076)

CO1	Understanding basic purpose of profession, professional ethics and various moral and social issues
CO2	Awareness of professional rights and responsibilities of a Engineer, safety and risk benefit analysis of a Engineer
CO3	Acquiring knowledge of various roles of Engineer In applying ethical principles at various professional level
CO4	Professional Ethical values and contemporary issues
CO5	Excelling in competitive and challenging environment to contribute to industrial growth.

PROJECT WORK/INTERNSHIP (EI8811)

CO1	On Completion of the project work students will be in a position to take up any challenging practical problems
CO2	And find solution by formulating proper methodology.