DEPARTMENT OF ELECTRICAL AND ELECTRONICS AND ENGINEERING

COURSE OUTCOMES

2019-2023 BATCH

SEMESTER 1

Course code & Course Name: EST120 BASICS OF CIVIL & MECHANICAL ENGINEERING

CO 1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
CO 2	Explain different types of buildings, building components, building materials and building construction
CO 3	Describe the importance, objectives and principles of surveying.
CO 4	Summarize the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
CO 5	Discuss the Materials, energy systems, water management and environment for green buildings.
CO 6	Analyze thermodynamic cycles and calculate its efficiency
CO 7	Illustrate the working and features of IC Engines
CO 8	Explain the basic principles of Refrigeration and Air Conditioning
CO 9	Describe the working of hydraulic machines
CO 10	Explain the working of power transmission elements
CO 11	Describe the basic manufacturing, metal joining and machining processes

Course code & Course Name: ESL 120 CIVIL & MECHANICAL WORKSHOP

CO 1	Name different devices and tools used for civil engineering measurements
CO 2	Explain the use of various tools and devices for various field measurements
CO 3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
CO 4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
CO 5	Compare different techniques and devices used in civil engineering measurements
CO 6	Identify Basic Mechanical workshop operations in accordance with the material and objects
CO 7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
CO 8	Apply appropriate safety measures with respect to the mechanical workshop trades

Course code & Course Name: EST 110 ENGINEERING GRAPHICS

CO 1	Draw the projection of points and lines located in different quadrants
CO 2	Prepare multiview orthographic projections of objects by visualizing them in different positions
CO 3	Draw sectional views and develop surfaces of a given object

CO 4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
CO 5	Convert 3D views to orthographic views
CO 6	Obtain multiview projections and solid models of objects using CAD tools

Course code & Course Name: CYT 100 ENGINEERING CHEMISTRY

CO 1	Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
CO 2	Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications
CO 3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterization of nanomaterials.
CO 4	Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
CO 5	Study various types of water treatment methods to develop skills for treating wastewater.

Course code & Course Name: CYL 120 ENGINEERING CHEMISTRY LAB

CO 1	Understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
CO 2	Develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
CO 3	Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
CO 4	Acquire the ability to understand, explain and use instrumental techniques for chemical analysis
CO 5	Learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
CO 6	Function as a member of a team, communicate effectively and engage in further learning. Also understand how chemistry addresses social, economic and environmental problems and why it is an integral part of curriculum

Course code & Course Name: HUN 101 LIFE SKILLS

CO 1	Define and Identify different life skills required in personal and professional life
CO 2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
CO 3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
CO 4	Take part in group discussions
CO 5	Use appropriate thinking and problem-solving techniques to solve new problems
CO 6	Understand the basics of teamwork and leadership

Course code & Course Name: MAT 101 LINEAR ALGEBRA AND CALCULUS

CO 1	solve systems of linear equations, diagonalize matrices and characterize quadratic forms
CO 2	compute the partial and total derivatives and maxima and minima of multivariable functions

CO 3	compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
CO 4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
CO 5	determine the Taylor and Fourier series expansion of functions and learn their applications.

SEMESTER 2

Course code & Course Name: EST 130 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

CO 1	Apply fundamental concepts and circuit laws to solve simple DC electric circuits
CO 2	Develop and solve models of magnetic circuits
CO 3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
CO 4	Describe working of a voltage amplifier
CO 5	Outline the principle of an electronic instrumentation system
CO 6	Explain the principle of radio and cellular communication

Course code & Course Name: EST 102 PROGRAMING IN C

CO 1	Analyze a computational problem and develop an algorithm/flowchart to find its solution
CO 2	Develop readable* C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators
CO 3	Write readable C programs with arrays, structure or union for storing the data to be processed
CO 4	Divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem
CO 5	Write readable C programs which use pointers for array processing and parameter passing
CO 6	Develop readable C programs with files for reading input and storing output

Course code & Course Name: MAT 102 VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS

CO 1	Compute the derivatives and line integrals of vector functions and learn their applications
CO 2	Evaluate surface and volume integrals and learn their inter-relations and applications.
CO 3	Solve homogeneous and non-homogeneous linear differential equation with constant coefficients
CO 4	Compute Laplace transform and apply them to solve ODEs arising in engineering
CO 5	Determine the Fourier transforms of functions and apply them to solve problems arising in engineering

Course code & Course Name: ESL 130 ELECTRICAL & ELECTRONICS WORKSHOP

CO 1	Demonstrate safety measures against electric shocks.
CO 2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
CO 3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
CO 4	Identify and test various electronic components
CO 5	Draw circuit schematics with EDA tools
CO 6	Assemble and test electronic circuits on boards
CO 7	Work in a team with good interpersonal skills

Course code & Course Name: EST 100 ENGINEERING MECHANICS

CO 1	Recall principles and theorems related to rigid body mechanics
CO 2	Identify and describe the components of system of forces acting on the rigid body
CO 3	Apply the conditions of equilibrium to various practical problems involving different force system.
CO 4	Choose appropriate theorems, principles or formulae to solve problems of mechanics
CO 5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses

Course code & Course Name: PHT 100 ENGINEERING PHYSICS A

CO 1	Compute the quantitative aspects of waves and oscillations in engineering systems.
CO 2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
CO 3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
CO 4	Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems
CO 5	Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system

Course code & Course Name: PHL 120 ENGINEERING PHYSICS LAB

CO 1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
CO 2	Understand the need for precise measurement practices for data recording
CO 3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
CO 4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
CO 5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results

Course code & Course Name: HUN 102 PROFESSIONAL COMMUNICATION

CO 1	Develop vocabulary and language skills relevant to engineering as a profession
CO 2	Analyze, interpret and effectively summarize a variety of textual content Analyze, interpret and effectively summarize a variety of textual content
CO 3	Create effective technical presentations
CO 4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
CO 5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions

Course code & Course Name: HUN 102 PROFESSIONAL COMMUNICATION

CO 1	Develop vocabulary and language skills relevant to engineering as a profession

CO 2	Analyze, interpret and effectively summarize a variety of textual content Analyze, interpret and effectively summarize a variety of textual content
CO 3	Create effective technical presentations
CO 4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
CO 5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions

SEMESTER 3

Course code & Course Name: EEL201 CIRCUITS AND MEASUREMENTS LAB

CO 1	Analyse voltage current relations of RLC circuits
CO 2	Verify DC network theorems by setting up various electric circuits
CO 3	Measure power in a single and three phase circuits by various methods
CO 4	Calibrate various meters used in electrical systems
CO 5	Determine magnetic characteristics of different electrical devices
CO 6	Analyse the characteristics of various types of transducer systems
CO 7	Determine electrical parameters using various bridges
CO 8	Analyse the performance of various electronic devices for an instrumentation system and, to develop the team management and documentation capabilities.

Course code & Course Name: CODE EEL203 ANALOG ELECTRONICS LAB

CO 1	Use the various electronic instruments and for conducting experiments.
CO 2	Design and develop various electronic circuits using diodes and Zener diodes.
CO 3	Design and implement amplifier and oscillator circuits using BJT and JFET.
CO 4	Design and implement basic circuits using IC (OPAMP and 555 timers)
CO 5	Simulate electronic circuits using any circuit simulation software.
CO 6	Use PCB layout software for circuit design

Course code & Course Name: EET201 CIRCUITS AND NETWORKS

CO 1	Apply circuit theorems to simplify and solve complex DC and AC electric networks.
CO 2	Analyse dynamic DC and AC circuits and develop the complete response to excitations.
CO 3	Solve dynamic circuits by applying transformation to s-domain.
CO 4	Analyse three-phase networks in Y and Δ configurations.
CO 5	Solve series /parallel resonant circuits
CO 6	Develop the representation of two-port networks using network parameters and analyse.

Course code & Course Name: EET203 MEASUREMENTS AND INSTRUMENTATION

CO 1	Identify and analyze the factors affecting performance of measuring system
CO 2	Choose appropriate instruments for the measurement of voltage, current in ac and dc measurements
CO 3	Explain the operating principle of power and energy measurement
CO 4	Outline the principles of operation of Magnetic measurement systems
CO 5	Describe the operating principle of DC and AC bridges, transducers based systems.
CO 6	Understand the operating principles of basic building blocks of digital systems, recording and display units

Course code & Course Name: EET205 ANALOG ELECTRONICS

CO 1	Design biasing scheme for transistor circuits.
CO 2	Model BJT and FET amplifier circuits.
CO 3	Identify a power amplifier with appropriate specifications for electronic circuit applications

CO 4	Describe the operation of oscillator circuits using BJT.
CO 5	Explain the basic concepts of Operational amplifier(OPAMP)
CO 6	Design and develop various OPAMP application circuits.

Course code & Course Name: EST 200 DESIGN AND ENGINEERING

CO 1	Explain the different concepts and principles involved in design engineering.
CO 2	Apply design thinking while learning and practicing engineering.
CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Course code & Course Name: CODE MAT 201 COURSE NAME PARTIAL DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS

CO 1	Understand the concept and the solution of partial differential equation.
CO 2	Analyse and solve one dimensional wave equation and heat equation.
CO 3	Understand complex functions, its continuity differentiability with the use of Cauchy/Riemann equations
CO 4	Evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
CO 5	Understand the series expansion of complex function about a singularity and Apply residue theorem to compute several kinds of real integrals

Course code & Course Name: CODE MCN201 SUSTAINABLE ENGINEERING

CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
CO 2	Explain the different types of environmental pollution problems and their sustainable solutions
CO 3	Discuss the environmental regulations and standards
CO 4	Outline the concepts related to conventional and non-conventional energy
CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

SEMESTER 4

Course code & Course Name: EEL202 ELECTRICAL MACHINES LAB I

CO 1	Analyse the performance of DC motors and DC generators by performing load test.
CO 2	Sketch the Open Circuit Characteristics of a self excited DC shunt generator and check conditions of voltage build up by performing suitable experiment.
CO 3	Develop equivalent circuit and predetermine their regulation and efficiency by performing OC & SC tests on transformer
CO 4	Analyse the efficiency and regulation of the transformer by performing load test.
CO 5	Analyse the efficiency of a DC machine when working as motor and generator by conducting suitable test.
CO 6	Examine the efficiency by performing Sumpner's test on two similar transformers.

Course code & Course Name: CODE EEL204 DIGITAL ELECTRONICS LAB

CO 1	Formulate digital functions using Boolean Algebra and verify experimentally
CO 2	Design and implement combinational logic circuits.
CO 3	Design and implement sequential logic circuits.
CO 4	Design and fabricate a digital circuit using the knowledge acquired from the laboratory.

Course code & Course Name: EET202 DC MACHINES AND TRANSFORMERS

CO 1	Acquire knowledge about constructional details of DC machines
CO 2	Describe the performance characteristics of DC generators
CO 3	Describe the principle of operation of DC motors and select appropriate motor types for different application
CO 4	Acquire knowledge in testing of DC machines to assess its performance
CO 5	Describe the constructional details and modes of operation of single phase and three phase transformers
CO 6	Analyse the performance of transformers under various conditions

Course code & Course Name: EET204 ELECTROMAGNETIC THEORY

CO 1	Apply vector analysis and coordinate systems to solve static electric and magnetic field problems.
CO 2	Apply Gauss Law, Coulomb's law and Poisson's equation to determine electrostatic field parameters
CO 3	Determine magnetic fields from current distributions by applying Biot-Savart's law and Amperes Circuital law.
CO 4	Apply Maxwell Equations for the solution of time varying fields
CO 5	Analyse electromagnetic wave propagation in different media.

Course code & Course Name: EET206 DIGITAL ELECTRONICS

CO 1	Identify various number systems, binary codes and formulate digital functions using Boolean algebra.
CO 2	Design and implement combinational logic circuits.

CO 3	Design and implement sequential logic circuits.
CO 4	Compare the operation of various analog to digital and digital to analog conversion circuits.
CO 5	Explain the basic concepts of programmable logic devices and VHDL.

Course code & Course Name: HUT 200 Professional Ethics

CO 1	Understand the core values that shape the ethical behavior of a professional.
CO 2	Adopt a good character and follow an ethical life.
CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.
CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Course code & Course Name: MAT 204 PROBABILITY, RANDOM PROCESSES AND NUMERICAL METHODS

CO 1	Understand the concept, properties and important models of discrete random variables and, using them, analyse suitable random phenomena.
CO 2	Understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena.
CO 3	Analyse random processes using autocorrelation, power spectrum and Poisson process model as appropriate.
CO 4	Compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
CO 5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations.

Course code & Course Name: MCN202 CONSTITUTION OF INDIA

CO 1	Explain the background of the present constitution of India and features.
CO 2	Utilize the fundamental rights and duties
CO 3	Understand the working of the union executive, parliament and judiciary.
CO 4	Understand the working of the state executive, legislature and judiciary.
CO 5	Utilize the special provisions and statutory institutions
CO 6	Show national and patriotic spirit as responsible citizens of the country

SEMESTER 5

Course code & Course Name: EEL331 MICROPROCESSORS AND MICROCONTROLLERS LAB

CO 1	Develop and execute assembly language programs for solving arithmetic and logical problems using microprocessor/microcontroller.
CO 2	Design and Implement systems with interfacing circuits for various applications.
CO 3	Execute projects as a team using microprocessor/microcontroller for real life applications.

Course code & Course Name: EEL333 ELECTRICAL MACHINES LAB II

CO 1	Analyse the performance of single phase and three phase induction motors by conducting suitable tests.
CO 2	Analyse the performance of three phase synchronous machine from V and inverted V curves
CO 3	Analyse the performance of a three phase alternator by conducting suitable tests.

Course code & Course Name: EET301 POWER SYSTEMS I

CO 1	Identify the power generating system appropriate for a given area
CO 2	Evaluate the electrical performance of any transmission line
CO 3	Compute various physical characteristics of underground and overhead transmission systems.
CO 4	Select appropriate switchgear for protection schemes
CO 5	Design a simple electrical distribution system as per the standards

Course code & Course Name: EET303 MICROPROCESSORS AND MICROCONTROLLERS

CO 1	Describe the architecture and timing diagram of 8085 microprocessor.
CO 2	Develop assembly language programs in 8085 microprocessor
CO 3	Identify the different ways of interfacing memory and I/O with 8085 microprocessor
CO 4	Understand the architecture of 8051 microcontroller and embedded systems.
CO 5	Develop assembly level and embedded C programs in 8051 microcontroller

Course code & Course Name: EET305 SIGNALS AND SYSTEMS

CO 1	Explain the basic operations on signals and systems.
CO 2	Apply Fourier Series and Fourier Transform concepts for continuous time signals.
CO 3	Analyse the continuous time systems with Laplace Transform
CO 4	Analyse the discrete time system using Z Transform.
CO 5	Apply Fourier Series and Fourier Transform concepts for Discrete time domain.
CO 6	Describe the concept of stability of continuous time systems and sampled data systems.

Course code & Course Name: EET307 SYNCHRONOUS AND INDUCTION MACHINES

CO 1	Analyse the performance of different types of alternators.
CO 2	Analyse the performance of a synchronous motor.
CO 3	Analyse the performance of different types of induction motors.
CO 4	Describe operating principle of induction machine as generator.
CO 5	Explain the types of single phase induction motors and their working principle.

Course code & Course Name: HUT 300 Industrial Economics & Foreign Trade

CO 1	Explain the problem of scarcity of resources and consumer behavior, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
CO 2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
CO 3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
CO 4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
CO 5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

Course code & Course Name: MCN 301 DISASTER MANAGEMENT

CO 1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
CO 2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand)
CO 3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand)
CO 4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply
CO 5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
CO 6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).

SEMESTER 6

Course code & Course Name: EEL332 POWER SYSTEMS LAB

CO 1	Develop mathematical models and conduct steady state and transient analysis of power system networks using standard software.
CO 2	Develop a frequency domain model of power system networks and conduct the stability analysis.
CO 3	Conduct appropriate tests for any power system component as per standards
CO 4	Conduct site inspection and evaluate performance ratio of solar power plant.

Course code & Course Name: EEL334 POWER ELECTRONICS LAB

CO 1	Determine the characteristics of SCR and design triggering circuits for SCR based circuits.
CO 2	Design, set up and analyse single phase AC voltage controllers.
CO 3	Design, set up and test suitable gate drives for MOSFET/IGBT.
CO 4	Design, set up and test basic inverter topologies.
CO 5	Design and set up dc-dc converters
CO 6	Develop simulation models of dc-dc converters, rectifiers and inverters using modern simulation tools.

Course code & Course Name: EET302 LINEAR CONTROL SYSTEMS

CO 1	Describe the role of various control blocks and components in feedback systems.
CO 2	Analyse the time domain responses of the linear systems
CO 3	Apply Root locus technique to assess the performance of linear systems
CO 4	Analyse the stability of the given LTI systems.
CO 5	Analyse the frequency domain response of the given LTI systems
CO 6	Design compensators using time domain and frequency domain techniques

Course code & Course Name: EET304 POWER SYSTEMS II

CO 1	Apply the per unit scheme for any power system network and compute the fault levels.
CO 2	Analyse the voltage profile of any given power system network using iterative methods.
CO 3	Analyse the steady state and transient stability of power system networks.
CO 4	Model the control scheme of power systems.
CO 5	Schedule optimal generation scheme

Course code & Course Name: EET306 POWER ELECTRONICS

CO 1	Explain the operation of modern power semiconductor devices and its characteristics.
CO 2	Analyse the working of controlled rectifiers.
CO 3	Explain the working of AC voltage controllers, inverters and PWM techniques.
CO 4	Compare the performance of different dc-dc converters
CO 5	Describe basic drive schemes for ac and dc motors.

Course code & Course Name: EET308 COMPREHENSIVE COURSE WORK

CO 1	Apply the knowledge of circuit theorems to solve the problems in electrical networks
CO 2	Evaluate the performance of DC machines and Transformers under different loading conditions
CO 3	Identify appropriate digital components to realise any combinational or sequential logic.
CO 4	Apply the knowledge of Power generation, transmission and distribution to select appropriate components for power system operation.
CO 5	Apply appropriate mathematical concepts to analyse continuous time and discrete time signals and systems

Course code & Course Name: EET322 RENEWABLE ENERGY SYSTEMS

CO 1	Describe the environmental aspects of renewable energy resources
CO 2	Explain the operation of various renewable energy systems.
CO 3	Design solar PV systems.
CO 4	Explain different emerging energy conversion technologies and storage.

Course code & Course Name: HUT 310 Management for Engineers

CO 1	Explain the characteristics of management in the contemporary context (Cognitive Knowledge level: Understand).
CO 2	Describe the functions of management (Cognitive Knowledge level: Understand).
CO 3	Demonstrate ability in decision making process and productivity analysis (Cognitive Knowledge level: Understand).
CO 4	Illustrate project management technique and develop a project schedule (Cognitive Knowledge level: Apply).
CO 5	Summarize the functional areas of management (Cognitive Knowledge level: Understand).
CO 6	Comprehend the concept of entrepreneurship and create business plans (Cognitive Knowledge level: Understand).

SEMESTER 7

Course code & Course Name: EET401 ADVANCED CONTROL SYSTEMS

CO 1	Develop the state variable representation of physical systems
CO 2	Analyse the performance of linear and nonlinear systems using state variable approach
CO 3	Design state feedback controller for a given system
CO 4	Explain the characteristics of nonlinear systems
CO 5	Apply the tools like describing function approach or phase plane approach for assessing the performance of nonlinear systems
CO 6	Apply Lyapunov method for the stability analysis of physical systems.

Course code & Course Name: EEL411 CONTROL SYSTEMS LAB

CO 1	Demonstrate the knowledge of simulation tools for control system design.
CO 2	Develop the mathematical model of a given physical system by conducting appropriate experiments.
CO 3	Analyse the performance and stability of physical systems using classical and advanced control approaches.
CO 4	Design controllers for physical systems to meet the desired specifications.

Course code & Course Name: EEQ413 SEMINAR

CO 1	Identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
CO 2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze)
CO 3	Prepare a presentation about an academic document (Cognitive knowledge level: Create)
CO 4	Give a presentation about an academic document (Cognitive knowledge level: Apply).
CO 5	Prepare a technical report (Cognitive knowledge level:Create)

Course code & Course Name: EET413 ELECTRIC DRIVES

CO 1	Describe the transient and steady state aspects electric drives
CO 2	Apply the appropriate configuration of controlled rectifiers for the speed control of DC motors
CO 3	Analyse the operation of chopper-fed DC motor drive in various quadrants
CO 4	Illustrate the various speed control techniques of induction motors
CO 5	Examine the vector control of induction motor drives
CO 6	Distinguish different speed control methods of synchronous motor drives

Course code & Course Name: MCN401 INDUSTRIAL SAFETY ENGINEERING

CO 1	Describe the theories of accident causation and preventive measures of industrial accidents. (Cognitive Knowledge level: Understand)
CO 2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
CO 3	Explain different issues in construction industries. (Cognitive Knowledge level: Understand)

CO 4	Describe various hazards associated with different machines and mechanical material handling. (Cognitive Knowledge level: Understand)
CO 5	Utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)

Course code & Course Name: EED415 PROJECT PHASE I

CO 1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply)
CO 2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
CO 5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).

SEMESTER 8

Course code & Course Name: EET402 ELECTRICAL SYSTEM DESIGN AND ESTIMATION

CO 1	Explain the rules and regulations in the design of components for medium and high voltage installations.
CO 2	Design lighting schemes for indoor and outdoor applications.
CO 3	Design low/medium voltage domestic and industrial electrical installations.
CO 4	Design, testing and commissioning of 11 kV transformer substation.
CO 5	Design electrical installations in high rise buildings.

Course code & Course Name: EET424 ENERGY MANAGEMENT

CO 1	Analyse the significance of energy management and auditing.
CO 2	Discuss the energy efficiency and management of electrical loads.
CO 3	Apply demand side management techniques.
CO 4	Explain the energy management opportunities in industries.
CO 5	Compute the economic feasibility of the energy conservation measures.

Course code & Course Name: EET468 INDUSTRIAL INSTRUMENTATION AND AUTOMATION

CO 1	Identify the sensors/transducers suitable for industrial applications.
CO 2	Design the signal conditioning circuits for industrial instrumentation and automation.
CO 3	Analyze the concepts of data transmission and virtual instrumentation related to automation
CO 4	Develop the logic for the process control applications using PLC programming
CO 5	Describe the fundamental concepts of DCS and SCADA systems

Course code & Course Name: EET436 POWER QUALITY

CO 1	Identify the sources and effects of power quality problems.
CO 2	Apply Fourier concepts for harmonic analysis.
CO 3	Explain the important aspects of power quality monitoring.
CO 4	Examine power quality mitigation techniques
CO 5	Discuss power quality issues in grid connected renewable energy systems.

Course code & Course Name: EED416 PROJECT PHASE II

CO 1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
CO 2	Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply)

CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
CO 5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply)