Course Outcomes of
Electrical Engineering Department
Academic Year 2022-23

Subject Code	Subject Name	CO-ID	CO-Statement
		SEMESTER – III	
EEC301	ENGINEERING MATHEMATICS-III	CO1	The Learner will be able to apply the concepts of Laplace Transform & inverse Laplace transform to solve differential problems.
		CO2	The Learner will be able to apply the concepts of Fourier series to write the function in terms of sine and cosine terms.
		CO3	The Learner will be able to apply concepts Complex variable theory to find the orthogonal trajectories.
		CO4	The Learner will be able to apply concepts of Matrix operations to solve Mathematical problems
		CO5	The Learner will be able to apply concept of Vector calculus to solve engineering problem.
		CO6	The Learner will be able to use the concept of higher Mathematics to solve Engineering Problems.
EEC302	ELECTRICAL CIRCUIT ANALYSIS	CO1	Apply electrical Network Theorems to analyze circuits.
		CO2	Analyze the effect of switching conditions on Electrical circuits using Differential equations.
		CO3	Analyze Electrical circuits using Graph Theory.
		CO4	Model and analyze Electrical circuits using Laplace Transform.
		CO5	Determine transfer function model of system using two port network parameters.
		CO6	Illustrate time domain behaviour from pole zero plot.
EEC303	FUNDAMENTALS OF ELECTRICAL MACHINES & MEASUREMENTS	CO1	To apply basic concepts of magnetism to electrical machines.
		CO2	To illustrate the principle of energy conversion in single and double excited machines.
		CO3	To analyze the effect of performance parameters of DC machines and applications of DC motors.
		CO4	To illustrate the working of various analog instruments used in analog measurement systems.
		CO5	To understand and analyze principle of potentiometer, calibration using potentiometer, extension of range, bridges and transducers used in measurement systems.
		CO6	To illustrate the working of various digital instruments in digital measurement systems.
EEC304	ELECTRICAL POWER SYSTEM I	CO1	To know about basic structure of power system network and types of transmission and distribution system
		CO2	To be aware of basic concept & terms related to overhead line insulator, earthing and cable.
		CO3	To apply and analyse the insulation issues related to overhead transmission line insulators and cables
		CO4	To be aware about the basic concept and derive the expression for parameters such as resistance, inductance and capacitance of AC transmission lines

Subject Code	Subject Name	CO-ID	CO-Statement
		CO5	To be aware of basic concept of power system representation and represent any given power system network in terms of equivalent power system
		CO6	To analyse the performance of equivalent power system developed for a given power system using modelling techniques
EEC305	ANALOG ELECTRONICS	CO1	To apply the knowledge of semiconductor devices to analyze the various applications in electronic circuits.
		CO2	To use the modelling approach to anlayse the dc and ac parameters of BJT Amplifiers.
		CO3	To use the modelling approach to analyse the dc and ac parameters of MOSFET Amplifiers.
		CO4	To use the basic functioning of operational amplifiers in designing op-amp based circuits.
		CO5	To analyze the practical design aspects of regulated power supply circuits using linear regulators.
EEL301	ELECTRICAL MACHINES & MEASUREMENTS LAB	CO1	Analyze different speed control methods of DC motors.
		CO2	Analyze the performance characteristics of DC machines through different tests.
		CO3	Demonstrate the use of bridges for measuring passive electrical components.
		CO4	Demonstrate the concept of extension of range of meters used in electrical measurements.
EEL302	ELECTRONICS LAB-I	CO1	To identify different semiconductor devices and demonstrate their applications in electronic circuits.
		CO2	To illustrate the use of op-amps in signal processing and waveform generators
		CO3	To analyze the performance of voltage regulator ICs and 555 timer ICs.
EEL303	SIMULATION LAB-I	CO1	Learner will be able to develop knowledge of software packages to model and program electrical and electronics circuits.
		CO2	Learner will be able to simulate electric machines/circuits for performance analysis.
		CO3	Learner will be able articulate importance of software packages used for simulation in laboratory experimentation /research by analyzing the simulation results.
EEL304	APPLIED ELECTRICAL ENGINEERING LAB (SBL)	CO1	Demonstrate the effective use of various electrical and electronic measuring lab equipment.
		CO2	Describe various electrical LV/HV substations, supply equipment and their connection in the network.
		CO3	Use different low voltage protective switchgears along with residential /industrial wiring practices.
		CO4	Analyze faults and learn techniques to perform repair and maintenance of common house-hold appliances.
		CO5	Illustrate the handling of Electrical fire and shock hazards safety challenges in real practice.
EEM-301	MINI PROJECT – 1A	CO1	Identify problems based on societal / research needs and analyse to provide suitable solution

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		CO2	Draw proper inferences from available results through theoretical/ Experimental /Simulations
		CO3	Analyse the impact of solutions in societal and environmental context for sustainable development.
		CO4	Develop interpersonal skills to work as member of a group demonstrating self-learning in a group leading to life-long learning.
		CO5	Demonstrate project management principles , oral and written communication skills during project work
SEMESTER – IV			
EEC401	ENGINEERING MATHEMATICS-IV	CO1	Learner will be able to use the concepts of Complex Integration for evaluating integrals.
		CO2	Learner will be able to apply the concept of Correlation, Regression and curve fitting to the engineering problems in data science.
		CO3	Learner will be able to apply the concepts of probability and expectation for getting the spread of the data and distribution of probabilities.
		CO4	Learner will be able to Apply the concept of Vector space to solve the Engineering problems.
		CO5	Learner will be able to Apply the concept of Quadratic form &SVD to solve the Engineering problems.
		CO6	Learner will be able to Apply the concept of Calculus of variation to solve mathematical models.
EEC402	ELECTRICAL AC MACHINES-I	CO1	To use the equivalent circuit to obtain the performance of a single phase transformer
		CO2	To determine the equivalent circuit parameters of single phase transformers using various test data
		CO3	To analyze the operation and performance for various types of connections in three phase transformers
		CO4	To determine the equivalent circuit parameters of three phase induction motor from the given test data and use it to obtain the performance curves
		CO5	To analyze different starting and speed control methods of single and three phase induction motors
EEC403	DIGITAL ELECTRONICS	CO1	to differentiate various number system and number system conversions.
		CO2	to design and implement Combinational logic circuits
		CO3	to design and implement sequential logic circuits
		CO4	to Analyze Analog to Digital conversion and Digital to Analog conversion.
		CO5	to summarize various semiconductor memories and their application in programmable logic devices
EEC404	POWER ELECTRONIC	CO1	Understand the basic operation and characteristics of various semi controllable and fully controllable devices

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	DEVICES AND CIRCUITS	CO2	Analyze various single phase and three phase power converter circuits and understand their applications
		CO3	Analyze dc to dc converter circuits and their applications
		CO4	Identify and describe various auxiliary circuits and requirements in power electronics applications such as gate driver circuit, snubber circuits and heat sinks
		CO5	Apply the basic concepts to select devices and converters for various applications
EEC405	ELECTRIC AND HYBRID ELECTRIC VEHICLES	CO1	To summarize the history and evolution of electric and hybrid electric vehicles to emphasize on the need and importance of EV/HEV for sustainable future.
		CO2	To identify various EV/HEVs drive train topologies and describe the modes of operation along with their power flow control.
		CO3	To select and design electric propulsion system components for EV/HEV drives for the desirable performance and control.
		CO4	To compare various energy sources and evaluate energy storage components for EV and HEV applications.
		CO5	To design EV/HEV drive train with energy management strategies by modelling approach.
		CO6	To recognize the need to adapt and engage in operations of EV/HEV with the absolute technological change in the transportation system for sustainable future.
EEL401	ELECTRICAL AC MACHINES LAB I	CO1	To use the equivalent circuit to obtain the performance of a single phase transformer
		CO2	To determine the equivalent circuit parameters of single phase transformers using various test data
		CO3	To analyze the operation and performance for various types of connections in three phase transformers
		CO4	To determine the equivalent circuit parameters of three phase induction motor from the given test data and use it to obtain the performance curves
		CO5	To analyze different starting and speed control methods of single and three phase induction motors
EEL402	PYTHON PROGRAMMING LAB	CO1	To use concepts of Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python for writing basic programs and execute the same.
		CO2	To use different Decision-Making, looping statements and Functions in Python for writing basic programs and execute the same.
		CO3	To apply Object Oriented Programming concepts to develop Python code for a particular application.
		CO4	To apply the functionalities of advanced Python Libraries to develop and execute Python programs.
		CO5	To design and develop GUI Applications in Python and evaluate different database operations.
EEL403	ELECTRONICS LAB II	CO1	To use various digital logic gates for design and analysis of various applications.

Subject Code	Subject Name	CO-ID	CO-Statement
		CO2	To build, design and analyse combinational and sequential logic circuits.
		CO3	To illustrate the operation of various power electronic devices and circuits
		CO4	To design and analyse power converters for various real life applications
EEL404	PCB DESIGN AND FABRICATION LAB (SBL)	CO1	Identify types of PCBs and various tools used for PCB design.
		CO2	Identify various electrical/electronic components and their packages/ footprints.
		CO3	Identify the use of PCB CAD tools and understand their features for the practical designs.
		CO4	Design and apply the schematic, board layout for simple, moderately complex and complex circuits.
		CO5	Develop and Test PCBs for simple and moderately complex circuits.
EEM401	MINI PROJECT – 1B	CO1	Apply Knowledge and skill to solve societal problems in a group.
		CO2	Demonstrate the ability to draw proper inferences from available results through theoretical/ experimental/Simulations.
		CO3	Analyse the impact of solutions in societal and environmental context for sustainable development.
		CO4	Demonstrate project management principles during project work.
		CO5	Demonstrate capability to excel in written oral communication and self-learning in a group for life long learning.
SEMESTER – V			
EEC501	ELECTRICAL AC MACHINES II	CO1	To use basic concepts of synchronous generators and analyze their performance from different tests by using appropriate method.
		CO2	To analyze performance of parallel operation of alternators.
		CO3	To apply d-q analysis to a salient pole synchronous machine to control its performance parameters.
		CO4	To analyze operating characteristics and performance of synchronous motor.
		CO5	To analyze ideal synchronous machine.
EEC502	ELECTRICAL POWER SYSTEM II	CO1	To analyze and apply symmetrical faults to power system for fault analysis
		CO2	To apply and analyze symmetrical component transformation for constructing sequence network of a power system
		CO3	To analyze and apply unsymmetrical faults to power system for fault analysis
		CO4	To interpret the concept of power system transients and solve problems on travelling waves
		CO5	To Identify and know the phenomenon of lightning, insulation coordination

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		CO6	To know the effect of corona on transmission line and find losses.
EEC503	CONTROL SYSTEM	CO1	Learner will be able to apply the fundamentals of control system to identify a suitable system for the given problem.
		CO2	Learner will be able to formulate mathematical models for control system using transfer function and state space techniques.
		CO3	Learner will be able to analyze the given control system for its stability, transient and steady-state behavior
		CO4	Learner will be able to analyze the stability and the transient behavior of the closed loop system using root locus technique
		CO5	Learner will be able to analyze the stability of the closed loop system using frequency domain techniques.
EEC504	ELECTROMAGNETIC FIELD AND WAVE	CO1	Learner will be able to interpret the basic mathematical concepts related to electromagnetic vector fields.
		CO2	Learner will be able to analyze problems relating to electric field, electric potential and electric energy density by applying the principles of electrostatics.
		CO3	Learner will be able to analyze problems relating to magnetic field, magnetic potential and magnetic energy density by applying the principles of magnetostatics.
		CO4	Learner will be able to apply electrostatic and magnetostatic boundary conditions to understand the effect of material medium on electric and magnetic fields.
		CO5	Learner will be able to interpret the concepts related to Faradays law, induced emf and Maxwells equations.
		CO6	Learner will be able to impart knowledge on the concepts of concepts of electromagnetic waves
EEDO 5011	RENEWABLE ENERGY SOURCES	CO1	Identify and analyze the opportunities and constraints for reliable, economical, and sustainable energy by reviewing current statistics and potential aspects of renewable & non-renewable energy sources in India and around the world.
		CO2	Identify and analyze the process of collection, storage & utilization of solar thermal energy.
		CO3	Identify and analyze the fundamentals, operating characteristics of solar PV, as well as the design methodology for standalone and grid-connected solar photovoltaic systems.
		CO4	Identify and analyze wind energy power systems.
		CO5	Identify and analyze the basic operation, types, and advances in technologies of fuel cell in the generation of energy.
		CO6	Summarize different features, types and current state-of-the-art for other non-conventional sources of energy in India.
EEL501	ELECTRICAL AC MACHINES LAB II	CO1	To analyze the operation of synchronous machines
		CO2	To determine and compare the voltage regulation of synchronous machines by various methods
		CO3	To analyze the synchronization or parallel operation of synchronous machines

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		CO4	To determine the parameters of synchronous machines
EEL502	SIMULATION LAB II	CO1	Students will be able to select and use the software packages to model and program electrical and electronics systems
		CO2	Students will be able to model and simulate different electrical and electronic circuits and analyze the results
		CO3	Students will be able to demonstrate importance of software packages used for simulation in laboratory experimentation /research/industry by analysing the simulation results
EEL503	CONTROL SYSTEM LAB	CO1	Learner will be able to illustrate the functioning of various components of closed loop control system
		CO2	Learner will be able to analyze the response of physical systems to standard test inputs
		CO3	Learner will be able to analyze the stability of the system using time domain and frequency domain techniques by simulation
EEL504	PROFESSIONAL COMMUNICATION AND ETHICS-II	CO1	Learner will be able to communicate effectively and ethically in both oral and written forms. [Tools: Book Report on any aspect of societal engineering, GDs based on Case studies of corporate/social dilemmas]
		CO2	Learner will be able to possess the skill set required for successful employability and exhibit leadership skills. [Tools: Debates, Mock MUNs, Book Report Planning & Presentation, assignment on interpersonal skills]
		CO3	Learner will be able to develop an acumen to prepare for various competitive exams, as also prepare reports and presentations on topics pertaining to the wellbeing of society and the environment. [Tools: Topic Proposal assignment, Assignment with citations and referencing in APA/IEEE format,]
		CO4	Learner will be able to demonstrate knowledge of professional and personal etiquettes & ethics in the global environment. [Tools: MCQ on IPR & Ethics, GD on social dilemmas, Final Presentation, Book Report]
EEM501	MINI PROJECT – 2 A	CO1	Apply Knowledge and skill to solve societal problems in a group.
		CO2	Demonstrate project management principles during project execution.
		CO3	Conclude the inferences from available results through theoretical/ experimental/ simulations.
		CO4	Demonstrate capability to excel in written, oral communication and self- learning in a group for lifelong learning.
SEMESTER- VI			
EEC601	POWER SYSTEM PROTECTION & SWITCHGEAR	CO1	To select the appropriate switching/protecting devices for substation and analyse its performance.
		CO2	To apply the basic concepts of circuit breaker and fuse and select the appropriate one for a specific application
		CO3	To select suitable relay and adjust its setting based on application and analyse its operation.
		CO4	To select suitable protection required for different components

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			of power system according to the type of fault and analyse its performance
		CO5	To select suitable protection method required for different types of transmission lines and analyse its performance under faults
		CO6	To Compare the features of conventional relays with Static and numerical relays
EEC602	MICROCONTROLLER APPLICATIONS	CO1	To demonstrate the features and architecture of PIC18 microcontroller.
		CO2	To apply the knowledge of PIC18F instructions to do programming in assembly language.
		CO3	To demonstrate the interfacing of PIC 18 microcontroller for various internal peripheral devices.
		CO4	To use the C programming knowledge for interfacing internal and external peripheral devices of PIC18 microcontroller.
		CO5	To Illustrate the interfacing of PIC 18 microcontroller with external peripheral devices.
EEC603	CONTROL SYSTEM DESIGN	CO1	Learner will be able to apply the fundamentals of compensators in control system to identify suitable compensator for the given problem.
		CO2	Learner will be able to analyze the system and design a suitable compensator to achieve the desired performance using root locus technique.
		CO3	Learner will be able to analyze the system and design a suitable compensator to achieve the desired performance using bode plot technique.
		CO4	Learner will be able to analyze the system and design a suitable controller and observer using state space technique for the desired performance.
		CO5	Learner will be able to formulate transfer function models and analyze the given system in digital form.
EEC604	SIGNALS AND SYSTEMS	CO1	To discriminate types of continuous and discrete time signals and systems.
		CO2	To derive the Z domain representation of discrete time signal.
		CO3	To analyze frequency response of systems using Z domain.
		CO4	To interpret discrete Fourier transform and fast Fourier transform.
		CO5	To design FIR and IIR filter.
EEDO 6013	HIGH VOLTAGE ENGINEERING	CO1	Learner will be able to interpret Electric field stress and surge voltages.
		CO2	Learner will be able to summarize different theories and mechanisms involved in breakdown of gaseous dielectrics.
		CO3	Learner will be able to differentiate between various theories and mechanisms occurring in the breakdown of solid, liquid dielectrics.
		CO4	Learner will be able to summarize and calculate the generation, measurement of high voltages and currents.

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		CO5	Learner will be able to analyze major requirements for designing High Voltage Laboratory.
EEDO 6014	ENERGY STORAGE	CO1	Identify the importance of energy storage system in power systems and other application domain.
		CO2	Identify the operational features, characteristics, types, and application of various thermal energy storage technologies.
		CO3	Identify the operational features, characteristics, types, and application various mechanical energy storage technologies.
		CO4	Identify the operational features, characteristics, types, and current state-of-the-art of various electrochemical energy storage methods
		CO5	Identify the operational features, characteristics, types, and current state-of-the-art of various electrical energy storage technologies.
		CO6	Identify and analyze the design methodology to determine capacity of energy storage system for various application.
EEL601	POWER SYSTEM PROTECTION & SWITCHGEAR LAB	CO1	To understand the working principle of various protective devices like Circuit breakers, fuses, switches and power contactors.
		CO2	To apply the concept of various over current protection scheme and its applications in power system
		CO3	To analyse different protection schemes of transformer and Induction motor.
		CO4	To analyze various protection schemes of transmission line.
EEL602	MICROCONTROLLER LAB	CO1	To use MPLABIDE software in debugging and executing assembly language programs.
		CO2	To use MPLABIDE software to implement the interfacing of internal peripheral devices of PIC18 microcontroller.
		CO3	To use MPLABIDE software to implement the interfacing of external peripheral devices with PIC18 microcontroller.
EEL603	CONTROL SYSTEM DESIGN LAB	CO1	Analyze various types of compensators and control algorithms using simulation platforms.
		CO2	Apply root-locus & Bode Plot techniques to analyze and design control systems.
		CO3	Analyze the effect of sampling time and compensator gain on stability for the given digital control systems.
EEL604	SBL-III: INDUSTRIAL AUTOMATION LAB	CO1	The learner will be able to acquainted with various components and subsystems used in industrial automation and their integration
		CO2	The learner will be able to integrate and interface components and subsystems used in industrial Automation using PLC.
		CO3	The learner will be able to design /implement / integrate microcontroller systems for any given applications.
EEM601	MINIPROJECT-2B	CO1	Apply knowledge and skill to identify and solve societal/environmental problems in a group.
		CO2	Develop interpersonal skills to work as member of a group or leader
		CO3	Demonstrate project management principles during project

Subject Code	Subject Name	CO-ID	CO-Statement
			execution.
		CO4	Conclude the inferences from available results through theoretical/ experimental/ simulations using standard norms of engineering practices
		CO5	Demonstrate capability to excel in written, oral communication
		CO6	Demonstrate capabilities of self-learning in a group, which leads to life-long learning
SEMESTER- VII			
EEC701	ELECTRICAL DRIVES & CONTROL	CO1	To apply the knowledge of dynamics of motor load system to solve problems on electrical drives
		CO2	To select the power rating of a motor for applications intended for various duty cycles
		CO3	To discuss the basic control requirements of electrical drives corresponding to different modes of operation and draw the block diagram of closed loop speed control schemes
		CO4	To analyze the basic working principles of power electronic DC drives with voltage current speed and torque waveforms
		CO5	To analyze the electrical braking and speed control methods in Induction motor drives
		CO6	To identify and analyze the different components of any one real life drive application
EEC702	ELECTRICAL POWER SYSTEM III	CO1	Identify, analyze and solve Load scheduling and unit commitment problem for sustainable development
		CO2	Identify and Analyze power system stability using equal area criterion
		CO3	Analyze load flow problems in power system using different techniques.
		CO4	Analyze steady state and dynamic response of load frequency control for single area
		CO5	Discuss the concept of interchange of power and energy between utilities
EEDO7012	HVDC TRANSMISSION SYSTEMS	CO1	To recognize the necessity of HVDC transmission in power system.
		CO2	To analyse the performance of converters for HVDC application
		CO3	To develop control characteristics for HVDC converters and analyse its operation under normal and abnormal conditions
		CO4	To analyse various firing control schemes used in conventional HVDC system
		CO5	To analyse the causes and effects of faults in HVDC system and its protection.
		CO6	To investigate the impact of HVDC transmission in power system.
EEDO 7021	MICROGRID AND SMART-GRID	CO1	To identify and state the impact of renewable energy integration for mitigating energy crises and sustainable future.
		CO2	To identify and state the concept of Microgrid along with its power topologies, control and communication architectures.

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		CO3	To apply and analyze the operational control of PCUs for MG sources in VMC/ CMC, Black-start, islanding and grid synchronization process.
		CO4	To state and analyze the Microgrid power control, protection and stability aspects in the context of communication architecture and energy storage.
		CO5	To identify and analyze the role of smart-technologies along with microgrid technologies in the formation of Smartgrid.
		CO6	To analyze the state of the art and predict the adoption of Microgrid and Smartgrid technologies in current electrical power system.
EEL701	ELECTRICAL DRIVES & CONTROL LAB	CO1	To Analyze the dynamic performance of AC and DC drives
		CO2	To Analyze the dynamics of braking in AC and DC drives
		CO3	To Analyze the performance of power electronic drives
		CO4	To Use simulation tool to analyze the performance of AC and DC drives
EEL702	SIMULATION LAB-III	CO1	Develop the skill to use the software packages to model and simulate electrical and electronics systems and analyze the results for laboratory experimentation /research/industry.
		CO2	Perform experiment on transmission line model and analyze the results for laboratory experimentation /research/industry.
		CO3	Analyze the operation of power system.
EEL703	DRIVES AND CONTROL LAB	CO1	Develop the skill to use the software packages to model and simulate electrical and electronics systems and analyze the results for laboratory experimentation /research/industry.
		CO2	Perform experiment on transmission line model and analyze the results for laboratory experimentation /research/industry.
		CO3	Analyze the operation of power system.
ILO7012	RELIABILITY ENGINEERING	CO1	A learner will be able to apply the concept of Probability theory to engineering problems.
		CO2	A learner will be able to apply various reliability concepts to calculate different reliability parameters.
		CO3	A learner will be able to illustrate the understanding of System Reliability.
		CO4	A learner will be able to illustrate reliability improvement techniques and System Reliability Analysis.
		CO5	A learner will be able to illustrate the various aspects of Maintainability, Availability and Failure Mode Effect and Criticality Analysis.
ILO7015	OPERATION RESEARCH	CO1	Apply and Summarize workings of the simplex method, the relationship between a linear program and its dual, including strong duality and complementary slackness.
		CO2	Analyse, Identify and Solve specialized LPP like transportation, assignment and dynamic programming problems.
		CO3	Select, Apply and Find the usage of Queuing Theory for solving engineering problems.

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		CO4	Apply simulation method and usage of simulation in managerial decision-making problems.
		CO5	Apply and solve given problems using Game Theory.
		CO6	Select and apply appropriate models and infer the outcome.
ILO 7016	CYBER SECURITY AND LAWS	CO1	To be aware about cybercrimes, information security and Indian IT Act 2000.
		CO2	To understand different types of cyberattacks and security measures to mitigate the attacks
		CO3	To understand different types of attacks and it countermeasures
		CO4	To interpret IT laws in various legal issues
		CO5	To recognize and apply Indian IT Act and its amendments
		CO6	To recognize and apply information security compliances.
ILO7415	DISASTER MANAGEMENT AND MITIGATION MEASURES	CO1	Students will be able to comprehend hazards, risks, vulnerability, capacities from social and technological, perspectives.
		CO2	Students will be able to recognize natural as well as man-made disaster and their extent along with its possible effects on the economy and dynamics of management.
		CO3	Students will be able to Comprehend national structures of development planning and disaster management based on previous history.
		CO4	Students will be able to describe the government policies, acts and various organizational structures associated with emergency.
		CO5	Students will be able to explain the simple dos and donts in extreme events and climate change for effective management of disasters.
ILO7018	ENERGY AUDIT AND MANAGEMENT	CO1	To know about Energy Conservation Act-2001 and its features towards enhancement of Energy security
		CO2	To use basic concept of energy optimization techniques and analyze its role in the energy audit process
		CO3	To apply various data information and financial analysis techniques to check feasibility of project in the energy audit process
		CO4	To apply energy conservation opportunities in energy systems, to enhance efficiency
		CO5	To analyse energy performance of various electrical and mechanical systems
EEL703	PROJECT-I	CO1	Apply the knowledge acquired based on curricular and co-curricular activities to solve electrical engineering related project work.
		CO2	Systematically analyze electrical engineering related project based on literature review.
		CO3	Design and develop hardware circuits and/or software code based on problems specification of the project.

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		CO4	Carry out different experiments to generate data, analyze and interpret the data and draw valid conclusions related to their project works
		CO5	Select and apply appropriate modern tools for the solution of their project problems.
		CO6	Know the responsibilities of an engineer towards the society with respect to their project works.
		CO7	Understand the impact engineering solutions related to their project work in societal and environmental context for sustainable development.
		CO8	Apply professional, ethical principles while project implementation, report writing and publications.
		CO9	Work effectively as an individual and as a member of a team while project work is carried out.
		CO10	Communicate effectively while project report writing and oral/visual presentations.
		CO11	Gain knowledge of engineering and management aspects while project is being implemented.
		CO12	Engage themselves in independent and life-long learning.
SEMESTER- VIII			
EEC801	ELECTRICAL SYSTEM DESIGN, MANAGEMENT AND AUDITING	CO1	To be aware of different power distribution systems and able to identify different components of power distribution network
		CO2	To identify required specifications of different components of a power distribution network and model it into the single line diagram
		CO3	To use basic concept of an energy optimization in the energy audit process.
		CO4	To analyze performance of an electrical system and optimize energy utilization.
		CO5	To analyze the energy performance of an electrical sub-system and propose energy efficient technologies to improve.
EEDO 8012	AUTOMATION AND CONTROL	CO1	To identify different automation and robotic systems, and use them in different applications.
		CO2	To select grippers and sensors for robotic application.
		CO3	To identify drives and control system components and use them in Robotics/Automation applications.
		CO4	To analyze dynamics and kinematics of robot using different methods and transformations.
		CO5	To analyze machine vision system of robot and robot programming.
		CO6	To apply system modelling and simulation techniques to optimize automation in manufacturing.
EEDO 8022	LIGHTING SYSTEM DESIGN	CO1	Apply the laws of illumination and lighting parameters to be used for lighting design.
		CO2	Identify various lamps, luminaries and their characteristics to be used for lighting design.

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		CO3	Design an Interior Lighting system through standards, design considerations and calculation for different application areas.
		CO4	Design an Exterior Lighting system through standards, design considerations and calculation for different application areas.
		CO5	Apply different Lighting Control schemes using standards and smart lighting technology.
EEDO 8024	ELECTRIC VEHICLE SYSTEM DESIGN	CO1	To select and size the electric motor for a particular EV application based on desirable performance criteria
		CO2	To evaluate the types and specifications of the EV chargers and charging infrastructure and impact on grid.
		CO3	To select and size the battery pack to meet desired EV performance
		CO4	To analyse the EMI /EMC issues in EV system integration
		CO5	To identify the design considerations of various automotive subsystems
		CO6	To identify the functional safety provisions in EV drive subsystems and systems
EEIO 8021	PROJECT MANAGEMENT-1	CO1	Learner will be able to illustrate Project Life Cycles and PM Knowledge areas as per Project Management Institute.
		CO2	Learner will be able to apply different selection criteria to select an appropriate project from different options.
		CO3	Learner will be able to develop work break down structure for a Project and schedule based on it.
		CO4	Learner will be able to identify opportunities and threats to the project and decide an approach to deal with them strategically.
		CO5	Learner will be able to apply Earned Value Technique, determine and predict the status of the Project.
		CO6	Learner will be able to understand various types of Project termination methods and ethics in Projects.
EEIO 8023	ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT	CO1	Learner will be able to define the roles, responsibilities and functions to become a successful entrepreneur.
		CO2	Learner will be able to summarize business plans, business development and Importance of Capital to Entrepreneurship.
		CO3	Learner will be able to summarize Social and Women entrepreneurship.
		CO4	Learner will be able to summarize different Acts and government policies for entrepreneurship.
		CO5	Learner will be able to summarize effective management of small and micro business.
EEIO 8028	DIGITAL BUSINESS MANAGEMENT	CO1	Students should be able to comprehend the concept of e - business contemporary trends and technology in digital business
		CO2	Students should be able to describe various agents of Ecommerce
		CO3	Students should be able to describe Digital business support services
		CO4	Students should be able to address security issues in Ecommerce and their counter measure s

Subject Code	Subject Name	CO-ID	CO-Statement
		CO5	Students should be able to examine e-business strategy formulation for the development of a successful plan and presentation of digital transformation
EEL801	ELECTRICAL SYSTEM DESIGN AND AUDIT LAB	CO1	To read and interpret electrical drawings and develop single line diagram of power distribution of their own house.
		CO2	To select appropriate specifications of components of a power distribution network and model it into the single line diagram
		CO3	To use CUSUM analysis to analyze the performance of the plant.
		CO4	To use energy efficient technologies to improve energy utilization.
EEL802	MEASUREMENT AND INSTRUMENTATION LAB	CO1	To select appropriate measuring instrument for measurement of specified electrical measurement.
		CO2	Identify and apply the best suitable instrument for a required typical measurement by making suitable changes in meter circuit.
		CO3	Select, make necessary changes and analyze the best suitable instrument for a required typical measurement and understand the conversion of digital to analog signal and vice versa.
EEL803	PROJECT-II	CO1	Apply the knowledge acquired based on curricular and co-curricular activities to solve electrical engineering related project work.
		CO2	Systematically analyze electrical engineering related project based on literature review.
		CO3	Design and develop hardware circuits and/or software code based on problems specification of the project.
		CO4	Carry out different experiments to generate data, analze and interpret the data and draw valid conclusions related to their project works
		CO5	Select and apply appropriate modern tools for the solution of their project problems.
		CO6	Know the responsibilities of an engineer towards the society with respect to their project works.
		CO7	Understand the impact engineering solutions related to their project work in societal and environmental context for sustainable development.
		CO8	Apply professional, ethical principles while project implementation, report writing and publications.
		CO9	Work effectively as an individual and as a member of a team while project work is carried out.
		CO10	Communicate effectively while project report writing and oral/visual presentations.
		CO11	Gain knowledge of engineering and management aspects while project is being implemented.
		CO12	Engage themselves in independent and life-long learning.