

Department of Electrical Engineering

Course Outcomes

Year	Course Name & Code	Course Outcome No.	Course Outcome
FE (2024 Course)	Basic Electrical Engineering (ESE-102-ELE)	CO1	Apply Kirchhoff's Laws, Superposition theorem and network simplification techniques for DC circuit analysis.
		CO2	Analyze the magnetic circuit parameters, self-Inductance, mutual Inductance and Electromotive Forces (EMF's).
		CO3	Calculate AC quantities using mathematical equations, waveforms and phasor diagrams.
		CO4	Compute the voltage, current and power of the given 1-phase and 3-phase AC circuits
		CO5	Understand the working principle of 1-Phase Transformer, Motors (DC, Induction) and their practical applications.
SE (2019 Course)	Engineering Mathematics-III (207006)	CO1	Solve higher order linear differential equation using appropriate techniques to model and analyze electrical circuits.
		CO2	Apply Integral transforms such as Laplace transform, Fourier transform and Z-Transform to solve problems related to signal processing and control systems.
		CO3	Apply Statistical methods like correlation, regression and Probability theory as applicable to analyze and interpret experimental data related to energy management, power systems, testing and quality control.
		CO4	Perform Vector differentiation and integration; analyze the vector fields and apply to wave theory and electro-magnetic fields.
		CO5	Analyze Complex functions, conformal mappings, and perform contour integration in the study of electrostatics, signal and image processing.
SE (2019 Course)	Power Generation Technologies(203141)	CO1	Identify components and elaborate working principle of conventional power plants.
		CO2	Recognize the importance and opportunities of renewable energies.
		CO3	Calculate and control power output of wind solar, and hydro power plant
		CO4	Describe process of grid interconnection of distributed generation and requirements.
		CO5	Interpret the environmental and social impact of various generation technologies.
SE (2019 Course)	Material Science(203142)	CO1	Discuss classification, properties and characteristics of different electrical engineering materials.
		CO2	State various applications measuring methods for parameters of different classes of electrical engineering materials

		CO3	Solve simple problems based on dielectric, magnetic and conducting materials.
		CO4	Solve simple problems based on dielectric, magnetic and conducting materials.
		CO5	Execute tests on dielectric, insulating, magnetic, conducting, resistive materials as per IS to decide the quality of the materials.
		CO6	Create learning resource material ethically to demonstrate self-learning leading to lifelong learning skills and usage of ICT/ online technology through collaborative/active learning activities
SE (2019 Course)	Analog And Digital Electronics(203143)	CO1	Design logical, sequential and combinational digital circuit using K-Map
		CO2	Demonstrate different digital memories and programmable logic families.
		CO3	Apply and analyze applications of OPAMP in open and closed loop condition
		CO4	Design uncontrolled rectifier with given specifications
SE (2019 Course)	Electrical Measurements and Instrumentation(203144)	CO1	Define various characteristic and classify measuring instruments along with range extension techniques
		CO2	Apply measurement techniques for measurement of resistance, inductance and capacitance
		CO3	Demonstrate construction, working principle of electro dynamo type and induction type instruments for measurement of power and energy.
		CO4	Make use of CRO for measurement of voltage, current and frequency
		CO5	Classify transducer and apply it for measurement of physical parameters in real time.
SE (2019 Course)	Power System-I (203145)	CO1	Recognize different patterns of load curve and calculate associated different factors with it and tariff
		CO2	Draft specifications of electrical equipment in power station.
		CO3	Design electrical and mechanical aspects in overhead transmission and underground cables
		CO4	Evaluate the inductance and capacitance of different transmission line configurations
		CO5	Analyze the performance of short and medium transmission lines
SE (2019 Course)	Electrical Machines-I (203146)	CO1	Evaluate performance parameters of transformer with experimentation and demonstrate construction along with specifications as per standards.
		CO2	Distinguish between various types of transformer connections as per vector groups with application

			and to perform parallel operation of single/three phase transformers
		CO3	Select and draft specifications of DC machines and Induction motors for various applications along with speed control methods.
		CO4	Justify the need of starters in electrical machines with merits and demerits
		CO5	Test and evaluate performance of DC machines and Induction motors as per IS standard.
SE (2019 Course)	Network Analysis (203147)	CO1	Calculate current/voltage in electrical circuits using simplification techniques, Mesh, Nodal analysis and network theorems.
		CO2	Analyze the response of RLC circuit with electrical supply in transient and steady state.
		CO3	Apply Laplace transform to analyze behavior of an electrical circuit.
		CO4	Derive formula and solve numerical of two port network and Design of filters
		CO5	Apply knowledge of network theory to find transfer function, poles and zeroes location to perform stability analysis and parallel resonance
SE (2019 Course)	Numerical Methods and Computer Programming (203148)	CO1	Demonstrate types of errors in computation and their causes of occurrence
		CO2	Calculate root of algebraic and transcendental equations using various methods.
		CO3	Apply numerical methods for various mathematical problems such as interpolation, numerical differentiation, integration and ordinary differential equation.
		CO4	Solve linear simultaneous equation using direct and indirect method
		CO5	Develop algorithms and write computer programs for various numerical methods
SE (2019 Course)	Fundamental of Microcontroller and Applications(203149)	CO1	Describe the architecture and features of various types of the microcontroller
		CO2	Illustrate addressing modes and execute programs in assembly language for the microcontroller.
		CO3	Write programs in C language for microcontroller 8051
		CO4	Elaborate interrupt structure of 8051 and program to handle interrupt and ADC809
		CO5	Define the protocol for serial communication and understand the microcontroller development systems
		CO6	Interface input output devices and measure electrical parameters with 8051 in real time
TE (2019 Course)	Industrial and Technology Management(303141)	CO1	Differentiate between different types of business organizations and discuss the fundamentals of economics and management.
		CO2	Explain the importance of technology management and quality management.
		CO3	Explain the importance of IPR and role of Human Resource Management.
		CO4	Understand the importance of Quality and its significance.
		CO5	Describe the characteristics of marketing & its

			types and overview of financial Management.
		CO6	Discuss the qualities of a good leader and road map to Entrepreneurship.
TE (2019 Course)	Power Electronics(303142)	CO1	Develop characteristics of different power electronic switching devices.
		CO2	Reproduce working principle of power electronic converters for different types of loads.
		CO3	Choose the appropriate converter for different applications.
TE (2019 Course)	Electrical Machines-II (303143)	CO1	Learn construction, working principle of three phase Synchronous Machines, Induction Motors, A.C. Series Motor and Special Purpose Motors.
		CO2	Understand characteristics of three phase Synchronous Machines, Induction Motors, A.C. Series Motor and Special Purpose Motors.
		CO3	Select the above machines in Power System, industrial, household & Military Engineering applications
		CO4	Testing of machines to evaluate the performance through experimentation.
TE (2019 Course)	Electrical Installation, Design and Condition Based Maintenance(303144)	CO1	Classify different types of distribution supply system and determine economics of distribution system. Compare and classify various substations, bus-bars and Earthing systems.
		CO2	Demonstrate the importance and necessity of maintenance.
		CO3	Analyse and test different condition monitoring methods.
		CO4	Carry out estimation and costing of internal wiring for residential and commercial installations
		CO5	Apply electrical safety procedures.
TE (2019 Course)	Elective-I: Advanced Microcontroller and Embedded System (303145A)	CO1	Explain architecture of PIC 18F458 microcontroller, its instructions and the addressing modes.
		CO2	Use Ports and timers for peripheral interfacing and delay generation.
		CO3	Interface special and generate events using CCP module.
		CO4	Effectively use interrupt structure in internal and External interrupt mode.
		CO5	Effectively use ADC for parameter measurement and also understand LCD interfacing.
		CO6	Use Serial Communication and various serial communication protocols.
TE (2019 Course)	Elective-I: Digital Signal Processing (303145B)	CO1	Analyse discrete time signals and systems.
		CO2	Construct frequency response of LTI system using Fourier Transform.
		CO3	Design and realize IIR and FIR filters.
		CO4	Apply concepts of DSP in applications of electrical engineering.
TE (2019 Course)	Power System-II (303148)	CO1	Solve problems involving modelling, design and performance evaluation of HVDC and EHVAC power transmission lines
		CO2	Calculate per unit values and develop Y bus for solution power flow equations in power

			transmission networks
		CO3	Calculate currents and voltages in a faulted power system under both symmetrical and asymmetrical faults, and relate fault currents to circuit breaker ratings.
TE (2019 Course)	Computer Aided Design of Electrical Machines (303149)	CO1	Summarize temperature rise, methods of cooling of transformer and consider IS 2026 in transformer design.
		CO2	Design the overall dimensions of the transformer.
		CO3	Analyze the performance parameters of transformer.
		CO4	Design overall dimensions of three phase Induction motor
		CO5	Analyze the performance parameters of three phase Induction motor
		CO6	Implement and develop computer aided design of transformer and induction motor
TE (2019 Course)	Control System Engineering(303150)	CO1	Construct mathematical model of Electrical and Mechanical system using differential equations and transfer function and develop analogy between Electrical and Mechanical systems.
		CO2	Determine time response of systems for a given input and perform analysis of first and second order systems using time domain specifications.
		CO3	Investigate closed loop stability of system in s-plane using Routh Hurwitz stability criteria and root locus.
		CO4	Analyze the systems in frequency domain and investigate stability using Nyquist plot and Bode plot
		CO5	Design PID controller for a given plant to meet desired time domain specifications
TE (2019 Course)	Elective II: IoT and Its Applications in Electrical Engineering (303151A)	CO1	Build circuits for signal acquisition and conditioning
		CO2	Experiment with sensors and actuators and choose the right sensor for application
		CO3	Determine the performance of IoT based automated process Determine the performance of IoT based automated process
		CO4	Design and develop IoT based applications
TE (2019 Course)	Elective-II: Electric Mobility (303151B)	CO1	Analyze the concepts of Hybrid and Electric vehicles.
		CO2	Describe the different types of energy storage systems
		CO3	Comprehend the knowledge of the battery charging and management systems.
		CO4	Classify the different mode of operation for hybrid vehicle.
		CO5	Apply the different Charging standards used for electric vehicles.
		CO6	Differentiate between Vehicle to home & Vehicle to grid concepts.
TE (2019 Course)	Elective-II: Cybernetics Engineering (303151C)	CO1	Define cybernetics in terms of control and how is it used in controlling technical, biological, and other processes.
		CO2	Understand various matrix operations.

		CO3	Describe different types of control system configurations and their applications.
		CO4	Carry out mathematical modeling and simulation of simple processes.
		CO5	Appreciate the essential requirements for computers and computer equipment that are intended to operate in dedicated applications and industrial environments
		CO6	Know intelligent optimization techniques.
TE (2019 Course)	Elective-II Energy Management (303151D)	CO1	Describe BEE Energy policies, Energy ACT.
		CO2	List and apply demand side management measures for managing utility systems.
		CO3	Explore and use simple data analytic tools
		CO4	Use various energy measurement and audit instruments.
		CO5	Evaluate economic feasibility of energy conservation projects.
		CO6	Identify appropriate energy conservations methods for electric and thermal utilities.
BE (2019 Course)	Power System Operation and Control(403141)	CO1	Summarize angle, voltage and frequency stability in the power system control (UN).
		CO2	Illustrate various ways of interchange of power between interconnected utilities (AP).
		CO3	Analyze stability and optimal load dispatch using different techniques (AN).
		CO4	Select appropriate FACTS devices for stable operation of the system (EV).
		CO5	Evaluate the stability of the system and suggest the methods to improve it (EV).
BE (2019 Course)	Advanced Control System (403142)	CO1	Explain compensation networks, common nonlinearities, the concept of state, sampling and reconstruction, and concepts of advanced controls (Understanding)
		CO2	Determine transfer function from state model (Applying)
		CO3	Test controllability and observability properties of the system (Evaluating)
		CO4	Design compensators, state feedback controls, and observers for the system (Creating)
BE (2019 Course)	Power Quality Management (403143B)	CO1	Understand power quality and attribute of power quality
		CO2	Describe voltage flicker and mitigation of it
		CO3	Analyze the effect of power system events on voltage sag and its characteristics.
		CO4	Identify the sources of harmonics and harmonics produced
		CO5	Select proper method for harmonic mitigation along with methods of power quality monitoring.
		CO6	Carry out power quality monitoring using power quality analyzers.
BE (2019 Course)	Electric and Hybrid Vehicle (403144B)	CO1	Analyze the Life Cycle Assessment of Li-ion battery.
		CO2	Describe the different types of Li-ion charging methods
		CO3	Comprehend the knowledge of drivetrain hybridization.
		CO4	Evaluate EV motor sizing.
		CO5	Classify Battery Recycling methods.

BE (2019 Course)	Switchgear and Protection (403148)	CO1	Understand the fundamentals of protective relaying.
		CO2	Demonstrate the arc interruption and analyze the RRRV in circuit breakers
		CO3	Demonstrate the construction and working principle of air brake circuit breakers, SF6 circuit breakers, and a vacuum circuit breaker
		CO4	Explain the characteristics of static and digital relays and their applications in power systems.
		CO5	Apply the differential protection scheme to large transformers, alternators, and induction motors
		CO6	Apply distance protection, three stepped protection for transmission line.
BE (2019 Course)	Advanced Electrical Drives and Control (403149)	CO1	Explain motor load dynamics and multi quadrant operation of drives.
		CO2	Analyze operation of converter fed and chopper fed DC drives.
		CO3	Apply different braking methods of D.C. and induction motor drive
		CO4	Elaborate vector control for induction motor and BLDC drives.
		CO5	Elaborate synchronous motor, reluctance motor drive
		CO6	Differentiate between classes and duty cycles of motors and select suitable drives in various industrial applications.
BE (2019 Course)	Smart Grid (403150C)	CO1	Apply the knowledge to differentiate between Conventional and Smart Grid
		CO2	Describe importance of Supercapacitors.
		CO3	Identify the need of Smart metering.
		CO4	Apply the communication technology in smart grid
		CO5	Comprehend the issues of micro grid.
BE (2019 Course)	Illumination Engineering (403151B)	CO1	Define and reproduce various terms in illumination.
		CO2	Identify various parameters for illumination system design.
		CO3	Design indoor and outdoor lighting systems.
		CO4	Enlist state of the art illumination systems.