



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Semester-I

AY: 2024-25

S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Engineering Mathematics –I M24BS102HS	CO1	Apply the Matrix methods to solve the system of linear equations	Apply
		CO2	Find the Eigen values and Eigenvectors and its application to matrices	Apply
		CO3	Solve functions using the mean value theorems.	Apply
		CO4	Find the extreme values of functions of two variables with/ without constraints	Apply
		CO5	Analyse the nature of sequence and series	Analyze
2	Chemistry M24BS101HS	CO1	Apply concept of electrode potential in identifying feasibility of electrochemical reaction; illustrate electro analytical techniques and working of batteries.	Apply
		CO2	Identify the mechanism of corrosion of materials on basis of electrochemical approach and devise corrosion control methods. Physical & Chemical parameters of Quality of Water and explain the process of Water treatment.	Understand
		CO3	Explain the influence of chemical structure on properties of materials and their choice in engineering applications.	Understand
		CO4	Classify chemical fuels and grade them through qualitative analysis	Analyze
		CO5	Relate the concept of green chemistry to modify engineering processes and materials. Understand the concepts and applications of spectroscopy	Understand
3	English M24HS101HS	CO1	Use correct pronunciation, stress and intonation while speaking English	Receive
		CO2	Illustrate ability to speak English coherently with less MTI	Respond
		CO3	Utilize appropriate verbal and non-verbal communication skills	Receive
		CO4	Express communication, interpersonal, leadership and team work skills in Group	Value
			Discussions	Organize
CO5	Create and demonstrate effective presentations and face interviews confidently	Organize		
4	Programming for Problem Solving M24ES105CS	CO1	Formulate algorithms and learn fundamental program methodologies of C programming.	Create
		CO2	Apply control statements to solve problems and implement derived data types in mathematical and engineering applications.	Apply
		CO3	Develop modular programming techniques to solve searching, sorting and file	Create

			system problems	
		CO4	Implement pointers and structures concept.	Apply
		CO5	Recognize pre-processor directives and user defined usage.	Understand
5	Chemistry Lab M24BS151HS	CO1	Perform accurate redox titrations by preparing and standardizing various solutions	Manipulate
		CO2	Demonstrate the ability to work with complexometric titrations and estimate total hardness of water	Precise
		CO3	Calibrate and use conductometer and perform titrations to estimate unknown concentration of solutions	Precise
		CO4	Calibrate and use potentiometer to determine unknown concentration of chemical solutions	Precise
		CO5	Execute colorimetric analysis to validate Beer's Law and to determine the concentration	Manipulate
6	English Lab M24HS151HS	CO1	Use correct pronunciation, stress and intonation while speaking English	Receive
		CO2	Illustrate ability to speak English coherently with less MTI	Respond
		CO3	Utilize appropriate verbal and non-verbal communication skills	Receive
		CO4	Express communication, interpersonal, leadership and team work skills in Group Discussions	Value
		CO5	Create and demonstrate effective presentations and face interviews confidently	Organize
7	Programming for Problem Solving Lab M24ES154CS	CO1	Choose appropriate data type for implementing programs in C language	Apply
		CO2	Design and implement modular programs involving input output operations, decision making and Looping constructs.	Create
		CO3	Apply derived data types and implement programs to store data in structures	Apply
		CO4	Explain the concepts of file handling and implement programs for file operations	Understand
		CO5	Develop confidence for self-education and ability towards lifelong learning need of computer	Create
8	Engineering Workshop Practice M24ES156ME	CO1	Handle and demonstrate the usage of different tools in various manufacturing trades by following safety procedures.	Precise
		CO2	Perform and execute basic jobs in engineering workshop trades such as fitting, carpentry, sheet metal, house wiring, welding, and foundry.	Manipulate
		CO3	Demonstrate the setup and working of various machine tools and perform basic operations such as machining, injection moulding, casting, and 3D printing.	Precise
		CO4	Demonstrate the operation of advanced machining processes such as CNC and rapid prototyping techniques.	Precise
		CO5	Assemble, disassemble, and install various computer hardware components and operating systems such as Windows or Linux	Manipulate



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Semester-II

AY: 2024-25

S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Engineering Mathematics –II M24BS203HS	CO1	Calculate the solutions of first order linear differential equations.	Apply
		CO2	Calculate the solutions of higher order linear differential equations.	Apply
		CO3	Apply the vector differential operator to scalar and vector functions and evaluate multiple integrals	Apply
		CO4	Evaluate the line, surface and volume integrals and converting them from one to another using Greens, Stokes and Gauss divergence theorems.	Evaluate
		CO5	Apply properties of Laplace & inverse Laplace transforms to solve ordinary differential equations.	Apply
2	Engineering Physics M24BS204HS	CO1	Explain the lasing action in lasers, propagation of light in optical fibers and compile their applications in Engineering fields.	Understand
		CO2	Explain the impact of crystallography on modern science. Analyze the properties of dielectric, magnetic, and superconducting materials for engineering applications.	Understand
		CO3	Apply the principles of quantized energy levels, de-Broglie’s hypothesis, and wave functions to solve problems and model applications in real-world quantum technologies	Apply
		CO4	Comprehend the concept of energy bands and band gaps in solids. understanding of the principles, properties, and applications of semiconductors, preparing them for advanced studies and careers in electronics, materials science, and related fields	Understand
		CO5	Demonstrate the preparation of thin films and nanomaterials to produce new functional materials	Understand
3	Engineering Mechanics M24ES204CE	CO1	Apply the fundamental concepts of forces, equilibrium conditions for static loads	Apply
		CO2	Determine the centroid and moment of inertia for various sections.	Apply
		CO3	Analyze the friction for single and connected bodies	Analyze
		CO4	Apply the basic concepts of dynamics, their behaviour, analysis and motion bodies.	Apply
		CO5	.Solve problems involving work energy principles and impulse momentum theory.	Apply

4	Fundamentals of Electrical and Electronics Engineering M24ES202EE	CO1	Explain concepts of Electrical Circuits, DC Machines, Transformers, Autotransformers, Diodes, Transistors and protective switches.	Understand
		CO2	Analyze electrical circuits by applying the concept of network reduction techniques and theorem.	Analyze
		CO3	Apply basic laws to derive EMF equation of DC generator, Transformers and Torque equation of DC Motor.	Apply
		CO4	Compare different types of DC Machines and different types of Transformers.	Analyze
		CO5	Compare Half & Full wave Rectifiers and Configurations of Transistors in CB, CE, CC modes.	Analyze
5	Environmental Science M24MC203CE	CO1	Describe the various types of natural resources.	Remember
		CO2	Differentiate between various biotic and abiotic components of ecosystem.	Remember
		CO3	Examine the values, threats of biodiversity, the methods of conservation, endangered and endemic species of India.	Understand
		CO4	Illustrate causes, effects, and control measures of various types of environmental pollutions.	Understand
		CO5	Explain the methods of water conservation, causes, and effects of climate change, global warming, acid rain and ozone layer depletion, population explosion.	Understand
6	Engineering Physics Lab M24BS252HS	CO1	Perform analytical and experimental tasks by applying prerequisite hands-on skills in engineering laboratory setups.	Manipulate
		CO2	Perform and calibrate precise measurement techniques while executing experiments to ensure accuracy and reliability of results	Manipulate
		CO3	Perform experimental setups to measure and record the electrical properties of semiconductor materials, determine the energy gap, threshold voltage, and solar cell efficiency, and compile conclusions from the data.	Manipulate
		CO4	Handle, calibrate, and test contemporary scientific instruments such as lasers and fiber optics to obtain accurate experimental data.	Manipulate
		CO5	Demonstrate teamwork by presenting, explaining, and reviewing laboratory results collaboratively	Precise
7	Fundamentals Of Electrical and Electronics Engineering Lab M24ES252EE	CO1	Measure electrical parameters such as R, L, C using electrical instruments such as LCR meter, and multimeter with accuracy.	Imitate
		CO2	Master fundamental laws and theorems (KVL, KCL, Superposition, Thevenin's, Norton's theorems) using appropriate tools and techniques.	Precise
		CO3	Master network theorems to simplify circuits for maximum power transfer and to validate theoretical principles (Tellegen's and Millman's theorem) through experimentation.	Precise
		CO4	Perform testing of electrical machines such as DC generators, shunt motors, and transformers under various loading conditions to determine their characteristic	Manipulate

			behaviour.	
		CO5	Assemble electronic components like diodes, Zener diodes, and BJTs to perform experiment and plot V-I characteristics to distinguish their operational behaviour and applications.	Manipulate
8	Engineering Graphics Lab M24ES253CE	CO1	Demonstrate the use of drawing instruments and AutoCAD basic commands to reproduce engineering graphics with accuracy.	Precise
		CO2	Construct and execute engineering curves such as conic sections, cycloids, and involutes using AutoCAD with precision.	Manipulate
		CO3	Develop orthographic projections of points, lines, planes, and solids in various orientations by applying AutoCAD drafting skills.	Naturalize
		CO4	Illustrate sectional views and surface developments of prisms, pyramids, cylinders, and cones using AutoCAD tools.	Manipulate
		CO5	Create and generate isometric and orthographic projections of simple and compound solids using AutoCAD for effective visualization of 3D objects.	Naturalize



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Semester-III

AY: 2024-25

S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Numerical Methods and Fourier Series 4BS303HS	CO1	Compute the solution of algebraic and transcendental equations using numerical methods.	Apply
		CO2	Apply numerical techniques to solve ordinary differential equations and definite integrals.	Apply
		CO3	Apply numerical methods to interpolate values and fit different curves from given data.	Apply
		CO4	Expand function as a Fourier series	
		CO5	Apply Fourier series transforms and inverse Fourier transform for given functions.	Apply
2	Electromagnetic Fields 4PC301EE	CO1	Explain the basic mathematical concepts related to electromagnetic vector fields, Faraday's law, induced emf, and Maxwell's equations.	Understand
		CO2	Explain coulomb's law, Gauss's law, Biot-Savart law, electric field intensity, magnetic field intensity, potential, and dipole.	Understand
		CO3	Apply the principles of electrostatics to obtain the solutions of problems relating to electric field and electric potential, and electric energy density.	Apply
		CO4	Apply the principles of magneto statics to obtain the solutions of problems relating to magnetic field and magnetic potential, and magnetic energy density.	Apply
		CO5	Analyze the conversion of vector from one coordinate system to another, the applications of EM waves in different Medias and to compute the time average power density, electric and magnetic boundary conditions.	Analyze
3	Electrical Circuits-I 4PC302EE	CO1	Explain the concepts of single phase, three phase systems and magnetic circuits.	Understand
		CO2	Calculate the parameters of magnetic circuits and electrical circuits under steady state condition.	Apply
		CO3	Analyze electrical circuits with network theorems, mesh and nodal analysis methods.	Analyze
		CO4	Analyze electrical circuits under resonance condition.	Analyze
		CO5	Analyze electrical circuits under transient condition with and without Laplace transforms.	Analyze
4	Programming for Problem Solving	CO1	Formulate algorithms and learn fundamental program methodologies of C programming.	
		CO2	Explain control statements and interpret derived data types with mathematical and engineering problems.	Understand
		CO3	Develop modular programming techniques to solve searching, sorting	Create
		CO4	Recognize pre-processor directives and user defined usage	

	4ES304CS	CO5	Develop modular programming techniques to solve searching file system problems	Create
5	Analog and Digital Electronics 4PC303EE	CO1	Illustrate the characteristics of various power amplifiers, operation of OPAMP and its applications	Apply
		CO2	Explain the concept of transistors and feedback oscillators	Understand
		CO3	Explain various logic gates and use the logic gates for combinational digital circuits and logic functions	Understand
		CO4	Explain sequential logic circuits and analyze the same	Understand
		CO5	Explain various A/D and D/A converters and programmable logic devices and arrays.	Understand
6	Human Values and Professional Ethics 4HS302HS	CO1	Identify the role of a human being in ensuring harmony in society and nature.	Receive
		CO2	Practice the significance of value inputs and start applying them in their life and profession.	Respond
		CO3	Compare between values and skills, happiness and accumulation of physical facilities with regard to the self and the body, intention and competence of an individual, etc.	Value
		CO4	Integrate the difference between ethical and unethical practices, and apply ethical practices in personal and professional lives.	Value
		CO5	Internalize ethical values in the light of the problems from the perspective of the social context.	Organize
7	Essence of Indian traditional knowledge 4MC302HS	CO1	Explain the concepts of Indian culture and Traditions and their Importance	Understand
		CO2	Distinguish the Indian Languages	Analyze
		CO3	Show the basic understanding of Indian religion and Philosophy	Understand
		CO4	Show the basic understanding about the fine arts in India	Understand
		CO5	Analyze and apply the principles of traditional Indian Education to contemporary learning systems	Analyze
8	Analog and Digital Electronics Lab 4PC351EE	CO1	Perform feedback amplifiers and op amp oscillators	Manipulate
		CO2	Execute single and multi-stage amplifier, wave shaping and controller circuits	Manipulate
		CO3	Master the working of logic gates.	Precise
		CO4	Master Combinational and Sequential logic circuits and its applications using Multisim	Precise
		CO5	Master the process of Analog to Digital conversion and Digital to Analog conversion and also Use PLCs to implement the given logical problem	Precise
9	Programming for Problem Solving Lab 4ES354CS	CO1	Choose appropriate data type for implementing programs in C language	Apply
		CO2	Design and implement modular programs involving input output operations, decision making and Looping constructs.	Create
		CO3	Apply derived data types and implement programs to store data in structures	Apply
		CO4	Explain the concepts of file handling and implement programs for file operations	Understand
		CO5	Develop confidence for self-education and ability towards lifelong learning need of computer	Create



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Semester-IV

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S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Managerial Economics Financial Accounts 4HS403BM	CO1	Determine the responsibilities & decision making in the Organization	Apply
		CO2	Explain various factors influencing demand & market structure	Understand
		CO3	Explain the principles of Accounting & solve the problems	Understand
		CO4	Analyze the Financial performance	Analyze
		CO5	Explain the capital structure & to take decision on selection of projects	Understand
2	Power Systems-I 4PC404EE	CO1	Explain the working principles, layouts, and components of various power systems including thermal, hydro, nuclear generation, transmission lines, and AC/DC distribution networks.	Understand
		CO2	Apply suitable techniques to improve power factor and calculate transmission line inductance and capacitance using GMR and GMD.	Apply
		CO3	Apply electrical engineering principles to calculate sag and tension in conductors and voltage drops in DC and AC distribution systems.	Apply
		CO4	Analyze the technical, structural, and economic aspects of power generation, transmission, and distribution systems including site selection, insulator behaviour, and AC system performance.	Analyze
		CO5	Evaluate the effectiveness of power generation methods, tariff structures, and cable grading techniques in optimizing system efficiency and performance.	Evaluate
3	Electrical Machines-I 4PC405EE	CO1	Explain & interpret electromechanical energy conversion principles, construction, working, characteristics and Speed control methods of DC machines and 1- ϕ transformers with EMF Equations, Auto transformers and identify different types of 3- ϕ transformer connections	Understand
		CO2	Apply principles of electromagnetic induction to explain the construction, operation, performance, and applications of various DC machines and justify the need for starters.	Apply
		CO3	Describe commutation and its improvement methods; predetermine transformer performance using equivalent circuits, voltage regulation, and efficiency calculations, explain construction, operation, and advantages 3- ϕ transformers	Apply

			over a bank of 1- ϕ transformers.	
		CO4	Analyze energy interactions in magnetic systems, different DC machine windings, effects of armature reaction and compensating windings, perform speed control techniques and calculate the efficiency and performance of DC machines under various operating conditions	Analyze
		CO5	Analyze transformer equivalent circuits, efficiency, losses, and load sharing in parallel operation, copper savings in auto-transformers, different three-phase transformer connections with their phase relationships and applications.	Analyze
4	Control Systems 4PC406EE	CO1	Analyze the concept of control systems, feedback, Mathematical modeling of Electrical and Mechanical systems	Analyze
		CO2	Analyze the time domain and frequency response analysis of control systems	Analyze
		CO3	Apply the knowledge of various analytical techniques used to determine the stability of control systems and Analyze the stability of systems and understand the importance of compensators	Apply
		CO4	Demonstrate controllability and observability of modern control systems	Understand
		CO5	Analyze the concept of control systems, feedback, Mathematical modeling of Electrical and Mechanical systems	Analyze
5	Electrical Circuits –II 4PC407EE	CO1	Explain the basic concepts of two port network, complex frequency, transformed network, graph theory, filters and attenuators.	Understand
		CO2	Compute two-port network parameters, and driving point impedance functions.	Apply
		CO3	Analyze electrical circuits with the concept of network topology.	Analyze
		CO4	Analyze and design various types of filters and attenuators.	Analyze
		CO5	Synthesize electrical network using Foster and Cauer Forms.	Evaluate
6	Python Programming 4ES405CS	CO1	Describe the syntax, data types, and structure of simple Python programs.	Understand
		CO2	Apply conditional and looping constructs to develop logical solutions for basic problems.	Apply
		CO3	Apply functions and arrays to perform modular and repeated computations like star-delta transformation.	Apply
		CO4	Manage and manipulate electrical data using lists, dictionaries, and file operations.	Apply
		CO5	Analyze and visualize electrical data using NumPy, Pandas, and Matplotlib, supporting clean energy solutions.	Analyze
7	Indian Constitution 4MC403HS	CO1	Acquire a general knowledge and back ground about the Constitution of India and its importance.	Understand
		CO2	Acquire distinguish and understand the working of the Central, state and provincial levels of administration.	Understand
		CO3	Demonstrate conscious about the fundamental duties, responsibilities and rights as	Understand

			an ideal citizen of India	
		CO4	Demonstrate perceive and interpret the functioning and distribution of resources between centre and state.	Understand
		CO5	Acquire awareness and relate to the existing hierarchy of the social structure, election.	Understand
8	Electrical Circuits Lab 4PC452EE	CO1	Measure electrical parameters such as R, L, C using electrical instruments such as LCR meter, and multimeter with accuracy.	Imitate
		CO2	Master the concepts of theorems to analyze the electrical circuits.	Precise
		CO3	Measure two-port network parameters of an electrical circuit.	Precise
		CO4	Perform experiment on DC and AC electrical circuits to evaluate its performance.	Manipulate
		CO5	Execute an MATLAB/SIMULINK/PYTHON code to study the behaviour of electrical circuits.	Manipulate
9	Control Systems Lab 4PC453EE	CO1	Develop transfer function of various control system plants practically by conducting the experiments.	Naturalize
		CO2	Study the Performance of P, PI and PID Controllers and Analyze the concepts to A.C and D.C position control system.	Manipulate
		CO3	Design lag and lead compensation networks.	Naturalize
		CO4	Apply the concepts of control systems in developing Program using MATLAB/PYTHON	Manipulate
		CO5	Determine the time response of second order system and Determine frequency response of compensating networks.	Precise
10	Python Programming Lab 4ES455EE	CO1	Master the use of fundamental Python programming constructs such as data types, operators, and control structures to develop basic computational logic.	Precise
		CO2	Execute modular programs using user-defined functions and string manipulation techniques	Manipulate
		CO3	Execute data organization using Python's lists, tuples, dictionaries, and perform file handling for reading and writing operations.	Manipulate
		CO4	Assemble engineering data using NumPy, Pandas, and plotting libraries to derive meaningful insights from datasets	Manipulate
		CO5	Master geospatial visualizations using Python tools to support site selection and sustainable planning of renewable energy systems such as solar farms and wind parks, contributing to increased adoption of clean energy.	Precise



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Semester-V

AY: 2024-25

S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Electrical Machines-II 4PC508EE	CO1	Analyze the construction and operating characteristics of 3-phase Induction machines, synchronous machines and Special Machines	Analyze
		CO2	Analyze the Induction motor and Synchronous machine performance for different loading conditions, as well as operating in parallel.	Analyze
		CO3	Explain speed control methods and tests to assess the performance of AC Machines.	Understand
		CO4	Identify and design the suitable AC machine for the desired application based on their characteristics.	Remember
		CO5	Analyze the starting methods of AC Machines.	Analyze
2	Power Electronics 4PC509EE	CO1	Explain the operation and Characteristics of power semiconductor devices	Understand
		CO2	Explain the triggering and commutation techniques of thyristor	Understanding
		CO3	Analyze single phase and three phase half controlled & full controlled rectifiers	Analyze
		CO4	Analyze AC voltage regulators circuits and Cycloconverters circuits	Apply
		CO5	Analyze chopping circuits and inverter circuits	Analyze
3	Power Systems-II 4PC510EE	CO1	Calculate and compare the performance (Constants A, B, C & D, voltage regulation & efficiency) of different types of Transmission lines.	Apply
		CO2	Explain the reasons for voltage variation, importance of maintaining constant voltage in power system and different voltage control methods.	Understand
		CO3	Calculate the P.U quantities in power system and analyze symmetrical fault (LLL Fault) and calculate S.C capacity of a Bus.	Apply
		CO4	Draw the diagram of Sequence networks of different components and compute the Unsymmetrical Fault (LG, LL, LLG & LLLG) current value & MVA values.	Apply
		CO5	Explain the concept of natural impedance of transmission line and its significance in the operation of power system network.	Understand
		CO1	Explain the construction, working principles, and types of electrical measuring	

4	Electrical Measurements and Instrumentation 4PC511EE		instruments, meters, bridges, transducers, and potentiometers.	Understand
		CO2	Apply appropriate bridge methods for measurement of resistance, inductance, and capacitance.	Apply
		CO3	Apply appropriate, potentiometers, and instrument techniques for measurement of resistance, voltage, current, power, energy, and magnetic parameters	Apply
		CO4	Apply LVDT transducers, Hall effect sensors, and strain gauges for measurement of physical parameters in analog and digital forms.	Apply
		CO5	Analyze the performance of measuring instruments and meters in terms of torque, sensitivity, loading effects, ratio and phase angle errors, and hysteresis behavior.	Analyze
5	Effective Technical Communication 4HS504HS	CO1	Handle Technical Communication effectively by overcoming barriers of communication.	Receive
		CO2	Use different types of Professional correspondence to communicate effectively.	Receive
		CO3	Use different types of Business and Inter Office Correspondence.	Receive
		CO4	Acquire adequate skills to draft reports efficiently.	Respond
		CO5	Enhance their skills of information transfer.	Value
6	Renewable Energy Sources 4PE502EE	CO1	Analyze principle of operation and applications of different Fuel cells	Understand
		CO2	Analyze the biomass conversion technologies , Biogas generation and Biogas plants	Analyze
		CO3	Demonstrate the concepts of disaster management	Understand
		CO4	Identify different types of disasters	Remember
		CO5	Explain the disaster management cycle	Understand
7	Disaster management 2OE501CE	CO1	Illustrate the role of NDMA in disaster management	Understand
		CO2	Explain the development of disaster mitigation plan	Understand
		CO3	Analyze principle of operation and applications of different Fuel cells	Understand
		CO4	Analyze the biomass conversion technologies , Biogas generation and Biogas plants	Analyze
		CO5	Demonstrate the concepts of disaster management	Understand
8	Startup Entrepreneurship 6OE501ME	CO1	Understand Entrepreneurship and Economic growth, Small and Large Scale Industries, Types and forms of enterprises.	Understand
		CO2	Identify the characteristics of entrepreneurs, Emergence of first generation entrepreneurs, Conception and evaluation of ideas and their sources.	Understand
		CO3	Practice the principles of project formulation, Analysis of market demand, Financial and profitability analysis and Technical analysis.	Analyze
		CO4	Understand the concept of Intellectual Property Rights and Patents	Understand
		CO5	Comprehend the aspects of Start-Ups.	Apply
		CO1	Conduct magnetization, load, and efficiency tests on DC shunt generators and motors to determine performance characteristics under various operating	Manipulate

9	Electrical Machines-I Lab 4PC554EE		conditions.	
		CO2	Perform brake tests on DC shunt and DC compound motors to evaluate torque, speed, efficiency, and power characteristics.	Manipulate
		CO3	Execute Hopkinson's test, Swinburne's test, retardation test, and separation of losses to experimentally determine losses and efficiency of DC machines.	Manipulate
		CO4	Master speed control methods of DC shunt motors by varying field and armature parameters and observe their effects on motor performance.	Precise
		CO5	Perform open-circuit, short-circuit, load, and Sumpner's tests on single-phase transformers to determine parameters, losses, efficiency, and regulation.	Precise
10	Electrical Measurements and Instrumentation Lab 4PC555EE	CO1	Measure resistance, inductance and capacitance using various bridges and LCR meters	Imitate
		CO2	Measure the amplitude, frequency and phase of an unknown sinusoidal signal using CRO.	Imitate
		CO3	Measure displacement using LVDT transducers with precision	Imitate
		CO4	Measure reactive and active power using single and two wattmeter methods respectively	Imitate
		CO5	Calibrate and test the energy meter and low power factor meter using appropriate standard methods	Precise



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Semester-VI

AY: 2024-25

S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Switch Gear and Protection 4PC612EE	CO1	Explain construction, working principles and testing of different electromagnetic relays, static relays, distance relays, differential relays and circuit breakers used to protect generators, Transformers, Transmission lines and distribution feeders.	Understand
		CO2	Analyze the characteristics of over current, over voltage, distance and differential relays	Analyze
		CO3	Select the ratings of relays and circuit breakers for different applications	Apply
		CO4	Explain the construction details, advantages and disadvantages of Gas insulated sub stations	Understand
		CO5	Select the protection method used against over voltages	Analyze
2	Power Electronic Control of Electrical Drives 4PC613EE	CO1	Acquire knowledge and understanding various drive system mechanisms, operating modes, characteristics.	Remember
		CO2	Apply power converters knowledge for the control of rectifier fed DC drives	Apply
		CO3	Apply power converters knowledge for the control of chopper fed DC drives	Apply
		CO4	Apply power converters knowledge for the control of Induction Motor drives	Apply
		CO5	Apply power converters knowledge for control of Synchronous Motor drives	Apply
3	Microprocessors & Micro Controllers 4PC614EE	CO1	Explain the functional architecture of the 8086 microprocessor by identifying and describing the roles of BIU, EU, registers, and addressing modes.	Understand
		CO2	Develop and execute 8086 assembly language programs to perform data transfer, arithmetic, logical, and control operations.	Create
		CO3	Demonstrate microprocessor interfacing by designing memory and I/O interfacing schemes using appropriate control and addressing signals.	Understand
		CO4	Classify different types of microcontrollers by comparing their architectures, features, and application areas.	Analyze
		CO5	Explain the ARM processor architecture by describing its core components, instruction set features, and typical applications.	Understand

4	Signals & Systems 4ES606EC	CO1	Classify types of signals and systems in continuous and discrete time	Analyze
		CO2	Apply the properties of Fourier transform for continuous time signals	Apply
		CO3	Solve differential equations and determine the response of the Continuous Time Linear Time Invariant Systems to known inputs	Apply
		CO4	Apply Z-transforms for discrete time signals to solve Difference equations	Apply
		CO5	Analyze Linear and circular Convolution on of discrete time signals with graphical representation.	Analyze
5	Electric Vehicles 4PE605EE	CO1	Identify and describe the history and evolvement of electric & hybrid electric vehicles to emphasize on the need and importance of EV/HEV for sustainable future	Remember
		CO2	Identify and describe the principles of EV/HEVs drive train topologies along with their power flow control and fuel efficiency estimation	Remember
		CO3	Design and select electric propulsion system components for EV/HEV drives suitability for the desirable performance and control	Create
		CO4	Compare and evaluate various energy sources and energy storage components for EV and HEV applications	Analyze
		CO5	Select different types of propulsion units and their control depending upon its application	Analyze
6	Software Engineering 3OE602CS	CO1	Acquired working knowledge of alternative approaches and techniques for each phase of SDLC.	Understand
		CO2	Judge an appropriate process model(s) for software project attributes and analyze requirements for project development.	Analyze
		CO3	Acquire skills necessary as an independent or as part of a team for architecting a complete software project by identifying solutions for recurring problems exerting	Understand
		CO4	Concede product quality through testing techniques employing appropriate metrics by understanding the practical challenges associated with the development of a significant software system	Apply
		CO5	Apply the software engineering principles in real time project development	Apply
7	Green Building Technologies 2OE602CE	CO1	Define a green building, along with its features, benefits and rating systems	Remember
		CO2	Describe the criteria used for site selection and water efficiency methods	Remember
		CO3	Explain the energy efficiency terms and methods used in green building practices	Understand
		CO4	Select materials for sustainable built environment & adopt waste management methods	Analyze
		CO5	Describe the methods used to maintain indoor environmental quality	Remember
		CO1	Conduct standard performance tests on single-phase and three-phase induction motors to determine efficiency, losses, and equivalent circuit parameters.	Manipulate

8	Electrical Machines-II Lab 4PC656EE	CO2	Perform experimental determination of voltage regulation of three-phase alternators using synchronous impedance, MMF, and ZPF methods.	Manipulate
		CO3	Plot and analyze V-curves, inverted V-curves, and power angle characteristics of synchronous machines through systematic experimentation.	Precise
		CO4	Execute experimental procedures to determine direct-axis and quadrature-axis reactances (X_d and X_q) of salient pole synchronous machines.	Manipulate
		CO5	Master and demonstrate speed control and power factor improvement techniques on induction motors and BLDC motors using appropriate control methods and components.	Precise
9	Power Electronics and Drives Lab 4PC657EE	CO1	Conduct experiments to obtain and plot the static characteristics of SCR and implement R, RC, and UJT firing circuits.	Manipulate
		CO2	Perform and verify commutation techniques of SCR and analyze the operation of single-phase half-controlled and fully-controlled rectifiers with R and RL loads.	Manipulate
		CO3	Test single-phase AC voltage regulators and cyclo-converters with R and RL loads by observing output waveforms and control characteristics.	Master
		CO4	Assemble and operate MOSFET-based chopper circuits and apply V/f control technique for speed control of induction motor.	Manipulate
		CO5	Build and Simulate to analyze power electronic converters and motor control systems including AC choppers, DC motor control using rectifiers and choppers, and three-phase inverters in 120° and 180° modes of operation.	Manipulate
10	Mini Project Seminar 4PW601EE	CO1	Demonstrate teamwork, ethical responsibility, and professional attitude while executing the mini project.	Value
		CO2	Identify the problem and apply basic engineering principles to propose a feasible mini project solution.	Apply
		CO3	Analyze system requirements and interpret results to assess the performance of the mini project.	Analyze
		CO4	Develop the mini project by using appropriate tools, components, and software under guidance.	Manipulate
		CO5	Test and demonstrate the mini project effectively with proper documentation and presentation.	Precise
11	Soft Skills Lab 4HS654HS	CO1	Master and demonstrate active listening skills by responding appropriately to conversations, situational dialogues, and motivational speeches delivered by native speakers.	Precise
		CO2	Master and demonstrate effective speaking skills by describing people, places, objects, and interpreting pictures using appropriate vocabulary and pronunciation.	Precise
		CO3	Perform oral presentations and role-plays by applying suitable etiquette and communication strategies in academic and professional situations.	Manipulate

		CO4	Master reading and writing techniques by skimming, scanning, paraphrasing texts, and composing slogans and social media messages relevant to given contexts.	Precise
		CO5	Execute interview-oriented communication skills by participating confidently in group discussions, debates, and mock interviews using appropriate verbal and non-verbal cues.	Manipulate



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S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Power System Operation and Control 4PC715EE	CO1	Solve load flow by appropriate modeling of the given power system and formulation of Y-bus.	Apply
		CO2	Evaluate generation mix for economic operation with and without transmission losses.	Evaluate
		CO3	Explain load frequency control and estimate the frequency deviation through modeling.	Understand
		CO4	Analyze and describe different types of power system stability and establish SSSL.	Analyze
		CO5	Identify various methods of voltage control and study the reactive power compensation.	Understand
2	Utilization of Electrical Energy 4PC716EE	CO1	Explain electrical heating and welding for industrial applications.	Understand
		CO2	Explain the control methods of induction and synchronous motors.	Understand
		CO3	Design illumination for different application.	Create
		CO4	Explain the traction mechanics.	Understand
		CO5	Explain the characteristics of traction motors	Understand
3	Power Electronics Applications to Power Systems 4PC717EE	CO1	Explain the reactive power compensation in Power Transmission system	Understand
		CO2	Explain importance of series and shunt compensation in Power Transmission system.	Understand
		CO3	Apply FACTS devices in Power Transmission system	Apply
		CO4	Apply the power transmission schemes – HVDC Transmission	Apply
		CO5	Study MTDC Transmission	Understand
4	Programmable Logic Controllers 4PC710EEE	CO1	Describe typical components of a Programmable Logic Controller.	Understand
		CO2	State basic PLC terminology and their meanings.	Understand
		CO3	Use latch, timer, counter, and other intermediate programming functions.	Apply
		CO4	Explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.	Understand
		CO5	Design and program a small, automated industrial production line.	Create

5	Power Quality Engineering 4PE712EE	CO1	Describe the different PQ disturbances and state remedies to improve PQ.	Understand
		CO2	Determine voltage sag for different network configurations.	Apply
		CO3	Demonstrate the effect of ASD systems on power quality and the effect of voltage sags on operation of various electrical machines.	Understand
		CO4	Evaluate harmonic levels for distribution systems.	Evaluate
		CO5	Describe power quality monitoring and measuring techniques.	Understand
6	Electrical Distribution Systems 4PE715EE	CO1	Explain the concept of different factors used in design of distribution systems.	Understand
		CO2	Analyze load characteristics, rate structure & types of Distribution Transformers.	Analyze
		CO3	Analyze & Solve Sub-Transmission lines and various substation Bus schemes with multiple feeders and analyze the design considerations and protection of Distribution systems.	Analyze
		CO4	Solve voltage drop, power loss calculations & justify placement of capacitor in distribution system.	Apply
		CO5	Design the optimal locations and ratings of shunt capacitors and Formulate Distribution automation like SCADA.	Create
7	Essential of Road Safety Engineering 2OE703CE	CO1	Explain fundamental principles of road safety.	Understand
		CO2	Analyze traffic safety data using statistical methods and engineering techniques.	Analyze
		CO3	Apply geometric design principles and integrate safety features into road infrastructure.	Apply
		CO4	Master traffic management systems to enhance road safety.	Precise
		CO5	Conduct road safety audits and develop comprehensive safety management systems.	Manipulate
8	Microprocessors & Microcontrollers Lab 4PC758EE	CO1	Operate the 8086 microprocessor trainer kit and execute assembly language programs using various addressing modes for data transfer, arithmetic, and logical operations.	Manipulate
		CO2	Develop and execute 8086 programs involving branching, looping, multiplication, division, array processing, and string manipulation to solve given computational problems.	Naturalize
		CO3	Master assembly language routines on 8086 for binary and BCD arithmetic operations and perform code conversions between BCD, ASCII, and packed/unpacked formats.	Precise
		CO4	Master the 8051 microcontroller trainer kit and execute programs using instruction set, timers, counters, and interrupts through appropriate C cross-compiler tools.	Precise
		CO5	Assemble, Interface and control external devices such as traffic signal systems and stepper motors using 8051 microcontroller by developing and testing embedded programs.	Manipulate

9	Power Systems Lab 4PC759EE	CO1	Conduct appropriate test on transmission lines and insulation systems to determine regulation	Manipulate
		CO2	Perform testing and plotting of characteristics of protective devices including IDMT over-current relays	Manipulate
		CO3	Execute experimental procedures to determine positive	Manipulate
		CO4	Develop simulation models for Y-bus formation	Naturalize
		CO5	Execute code to analyze advanced power system operation and control problems including economic power scheduling using MATLAB/SIMULINK	Manipulate
10	Comprehensive Viva Voce 4PW752EE	CO1	Demonstrate the ability to recall, organize, and articulate concepts from core and allied engineering subjects during the comprehensive viva voce.	Precise
		CO2	Master problem-solving procedures and methodologies while responding to technical and analytical questions in the viva examination.	Precise
		CO3	Present technical explanations clearly and systematically using correct terminology, diagrams, and equations wherever required.	Respond
		CO4	Integrate knowledge from multiple semesters to justify design choices, experimental outcomes, and engineering decisions during oral examination.	Articulate
		CO5	Exhibit professional communication skills, confidence, and logical reasoning while interacting with the examination committee.	Articulate
11	Summer Internship Seminar 4PW753EE	CO1	Perform assigned industrial tasks by following workplace practices, safety norms, and organizational procedures during the internship period.	Manipulate
		CO2	Execute planned technical work by applying appropriate tools, techniques, and engineering practices relevant to the assigned project.	Manipulate
		CO3	Document project activities, experimental results, and technical progress systematically in the form of reports, logs, and supporting records.	Value
		CO4	Demonstrate teamwork and professional interaction skills by actively participating in discussions with industry mentors, faculty coordinators, and project teams.	Precise
		CO5	Present and defend the completed internship work effectively through a technical report and seminar presentation using appropriate technical communication skills.	Articulate



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Semester-VIII

AY: 2024-25

S.NO.	Course Name with Code	CO Number	Course Outcomes	Taxonomy Level
1	Grid Integration of Renewable Energy Systems 4PE822EE	CO1	Identify the characteristics of renewable energy sources and converters.	Understand
		CO2	Explain the operation of power system	Understand
		CO3	Analyze the importance of power electronic systems in renewable power applications.	Analyze
		CO4	Analyze the management systems for grid integration.	Analyze
		CO5	Analyze the challenges faced by the grid by integrating renewable energy sources.	Analyze
2	Industrial Management & Engineering 6OE804ME	CO1	Explain the concept of scientific management.	Understand
		CO2	Apply different types of inventory models in material management.	Apply
		CO3	Apply the concepts of PERT and CPM techniques in project management.	Apply
		CO4	Analyse the elements of costing and determine the selling price.	Analyze
		CO5	Apply job evaluation and merit rating techniques to evaluate the performance of employees.	Apply
3	Project 4PW854EE	CO1	Demonstrate professional ethics, teamwork, and social responsibility while planning and executing the project.	Value
		CO2	Apply engineering knowledge and problem-solving techniques to analyze requirements and design an appropriate solution for a real-world problem.	Analyze
		CO3	Develop and assemble the project hardware/software components using appropriate tools, techniques, and engineering practices.	Naturalize
		CO4	Test, integrate, and troubleshoot the developed system to achieve the intended functionality and performance.	Articulate
		CO5	Demonstrate proficiency in operating, validating, and presenting the completed project through documentation, demonstration, and viva-voce.	Precise