Progressive Education Society's
Modern College of Engineering
Department of Electrical Engineering

Progressive Education Society's
MODERN COLLEGE OF ENGIINEERING
DEPARTMENT OF ELECTRICAL ENGINEERING

S.E COURSE:2019
Statement of Course Outcomes (COs)
Note: A:Theory B:Practical

Subject	CODE	CO
		Course outcome (CO)
Engineering Mathematics-III	C201.1A	Students will understanding the concepts of higher order Linear Differential Equations and evaluating L-C-R electrical circuits
	C201.2A	Students can evaluate Laplace, Fourier and Z-transforms and its application to solve Linear differential equation and difference equations.
	C201.3A	Students can evaluate central tendency, dispersion, moment, correlation, regression and probability distribution of data.
	C201.4A	Students can apply vector differential operator on scalar and vector point functions to deal with Directional Derivatives, Solenoidal, Irrotational, Scalar Potential function and Conservative vector fields.
	C201.5A	Students can apply Greens, Gauss divergence, Stokes theorem to evaluate Line integral, Surface integral, volume integrals and solve problems in Electromagnetic fields
	C201.6A	Students will be able to check analyticity of the functions using Cauchy- Riemann Theorem, evaluate bilinear transformation and apply Cauchy's integral theorem, residue theorem to evaluate line integrals in the complex plane
Power Generation Technologies	C202.1A	students will be able to explain components and working principle of thermal power plant.
	C202.2A	Students will be able to explain components and working principle of nuclear, deisel and gas power plant.
	C202.3A	Students will be able to recognize the importance of renewable energies.
	C202.4A	students will be able to derive output power of wind solar, and hydro power plant.
	C202.5A	Students will be able to outline distributed generation and grid interconnection .
	C202.6A	Students will be able to relate the environmental and social impact of various generation technologies .
Material Science	C203.1A	Students will be able to list the dielectric properties of different insulating materials.

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	C203.2A	Students will be able to test dielectric , insulating, conducting ,resistive materials as per IS specifications
	C203.3A	Students will be able to classify insulating materials.
	C203.4A	Students will be able to relate applications of nano technology.
	C203.5A	Students will be able to choose conducting materials for different applications.
	C203.6A	Students will be able to develop learning resource material ethically to demonstrate self lifelong learning skills, usages of ICT , online technology through collabrative active learning activities.
	C203.1B	students will be able to determine dielectric strength of solid, liquid, gaseous insulating materials
	C203.2B	Students will be able to find 3 phase reactive power of capacoitor bank & resistivity of high resistive alloys
	C203.3B	Students will be able to explain principle of thermocouple
	C203.4B	Students will be able to demonstrate phenomina of treeing & tracking
	C203.5B	Students will be able to list methods of testing of resins & polymers
Analog and Digital Electronics	C204.1A	students will be able to Design logical and combinational digital circuit using K-Map
	C204.2A	students will be able to Design sequential digital circuit using K-Map
	C204.3A	Students will be able to Demonstrate different digital memories and programmable logic families
	C204.4A	Students will be able to Apply the knowledge of op-amp in open loop, close loop configuration and as wave form generators.
	C204.5A	Student will be able Apply the knowledge of op-amp as filter and analyse applications of OPAMP

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Subject	CODE	CO
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	C204.6A	Students will be able to do analysis of uncontrolled rectifier.
	C204.1B	Students will be able to design logical and combinational digital circuit using K-Map
	C204.2B	Students will be able to Design sequential digital circuit using K-Map
	C204.3B	Students will be able to Apply the knowledge of op-amp in open loop, close loop configuration and as wave form generators
	C204.4B	Students will be able to Apply the knowledge of op-amp as filter and analyse applications of OPAMP
	C204.5B	Students will be able to do analysis of uncontrolled rectifier specification
Electrical Measurement& Instrumentation	C205.1A	Student will be able Understand various characteristics of measuring instruments, their classification and range extension technique.
	C205.2A	Student will be able to apply measurement techniques for measurement of resistance and inductance.
	C205.3A	Student will be able to explain construction, working principle and use of dynamometer type wattmeter for measurement of power under balance and unbalance condition.
	C205.4A	Students will be able to explain construction, working principle of 1-phase and 3-phase induction, static energy meter and calibration procedures.
	C205.5A	Students will be able to make use of CRO and DSO for measurement of various electrical parameters.
	C205.6A	Students will be able to understand the characteristics of transducers and measure various physical parameters using transducers.
	C205.1B	Student will be able to use Anderson's bridge for measurement of inductance.

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Subject	CODE	CO
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	C205.2B	Student will be able to calculate active & reactive power in three phase circuit using wattmeter method
	C205.3B	Student will be able to understand Calibration of single phase energy meter at different power factors.
	C205.4B	Students will be able to use CRO and transducers for measurement of various electrical parameters.
Applicationsof Mathematics in Electrical Engineering	C206.1B	Student will be able to apply fundamentals of mathematics in solving electrical engineering problem
	C206.2B	Students will be able to analyze complex electrical engineering problem using mathematical techniques.
	C206.3B	Students will be able to implement program and simulation for problems in electrical engineering.
	C206.4B	Students will be able to demonstrate self lifelong learning skills with applications of mathematics in electrical engineering through software.
Soft Skill	C207.1B	Students will be able to demonstrate SWOT analysis.
	C207.2B	Students will be able to develop communication skills and interpersonal relationships.
	C207.3B	Students will be able to apply etiquettes in workplace and society, leadership qualities.
	C207.4B	Students will be able to describe stress management, time management
PowerSystem-I	C208.1A	Students will be able to summarize different patterns of load curve and calculate associated different factors with it and tariff.
	C208.2A	Students will be able to describe specifications of various electrical equipment in power station
	C208.3A	Students will be able to Design electrical and mechanical characteristic in overhead transmission and underground cables

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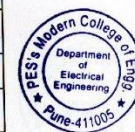**DEPARTMENT OF ELECTRICAL ENGINEERING**

S.E COURSE:2019
Statement of Course Outcomes (COs)
Note: A:Theory B:Practical

Subject	CODE	CO
		Course outcome (CO)
	C208.4A	Students will be able to evaluate the inductance and capacitance of different transmission line configurations
	C208.5A	Students will be able to analyze the performance of short and medium transmission lines
Electrical Machines-I	C209.1A	Students will be able to describe construction, working and applications of single phase transformers
	C209.2A	Students will be able to analyse operation of single and three phase transformers under various loading conditions.
	C209.3A	Students will be able to explain construction, working and applications of d c machines
	C209.4A	Students will be able to evaluate different techniques of speed control and performance parameters of d. c. machines.
	C209.5A	Students will be able to describe construction, working and applications of three phase Induction motor
	C209.6A	Students will be able to examine performance parameters of three phase induction motor under various operating conditions.
	C209.1B	Students will be able to calculate the performance of single phase transformer, D.C. Motor and three phase Induction motor.
	C209.2B	Students will be able to demonstrate load sharing of single phase transformers using parallel operation.
	C209.3B	Students will be able to analyse the parameters of equivalent circuit of transformer and induction motor
	C209.4B	Students will be able to apply the starting methods for DC motor and Induction motor.
Network Analysis	C210.1A	Students will be able to characterize types of networks and formulate network equations for loop and nodal analysis.

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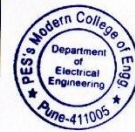## Department of Electrical Engineering

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S.E COURSE:2019
Statement of Course Outcomes (COs)
Note: A:Theory B:Practical

Subject	CODE	CO
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	C210.2A	Students will be able to define and implement network theorems to solve various circuits.
	C210.3A	Students will be able to analyze transient response of basic circuits using classical method.
	C210.4A	Students will be able to analyze transient response of basic circuits using Laplace transform.
	C210.5A	Students will be able to describe and synthesize two-port network, network functions and identify stability of networks.
	C210.6A	Students will be able to define, recognize and design passive filters.
	C210.1B	Students will be able to evaluate network theorems calculations to have the better insight of circuits.
	C210.2B	Students will be able to illustrate the transient and steady state behaviour of basic circuits and able to simplify it using initial conditions and LAPLACE transform.
	C210.3B	Students will be able to develop analytical qualities of different two-port networks, network functions and identify stability of networks.
	C210.4B	Students will be able to calculate various network function parameter, to studeny the stability of networks.
NumericalMethods &Computer Programming	C211.1A	Understand types of errors in computation and their causes of occurrence.
	C211.2A	Students will be able to Identify various types of equations and apply appropriate numerical method to solve transdental equations and curve fitting techniques.
	C211.3A	Students will be able to Apply different numerical methods for solving interpolation numericals
	C211.4A	Students will be able to Apply different numerical methods for solving Differnciation and numerical Integration

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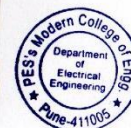## Department of Electrical Engineering

S.E COURSE:2019
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Note: A:Theory   B:Practical

Subject	CODE	CO
		Course outcome (CO)
	C211.5A	Students will be able to Apply different numerical methods for solving linear simultaneous equation
	C211.6A	Students will be able to Apply different numerical methods for solving ordinary Differnciatial equation
	C211.1B	Students will be able to analyze algorithm, draw flow chart and write a program to implement basic python concepts
	C211.2B	Students will be able to Analyze a program in python to solve Differential Equation/ Integration for electrical application.
	C211.3B	Students will be able to Analyze a program in python for iterative Interpolation for electrical application.
	C211.4B	Students will be able to Analyze a program in python to solve iterative linear simultaneous equation for electrical application.
Fundamentalof Microcontroller andApplications	C212.1A	Students will be able to describe the architecture and features of various types of the microcontroller.
	C212.2A	Student will be able to execute programs in assembly language for the microcontroller.
	C212.3A	Students will be to apply knowledge of writing programs in C language for microcontroller 8051.
	C212.4A	Student will be able to study interrupt structure of 8051 and apply program to handle interrupt and ADC809
	C212.5A	Student will be able to explain protocol for serial communication and microcontroller development systems.
	C212.6A	Students will be able to Interface input output devices and measure electrical parameters with 8051 in real time.
	C212.1B	Students will be able to demonstrate 8051 Microcontroller trainer kit

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Subject	CODE	CO
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	C212.2B	Students will be able to develop programs using embedded C and ALP in 8051 microcontroller
	C212.3B	Students will be able to illustrate how the different peripherals are interfaced with Microcontroller
	C212.4B	Students will be able to use the interfacing circuits for various applications of 8051 microcontroller.
Project Based Learning	C213.1B	Student will be able to identify, formulate, and analyze the simple project problem.
	C213.2B	Student will be able to apply knowledge of mathematics, basic sciences, and electrical engineering fundamentals to develop solutions for the project.
	C213.3B	Student will be able to learn to work in teams, and to plan and carry out different tasks that are required during a project.
	C213.4B	Student will be able to understand their own and their team-mate's strengths and skills.
	C213.4B	Student will be able to apply knowledge to draw information from a variety of sources and be able to filter and summarize the relevant points.
	C213.4B	Student will be able to apply oral, visual, and written forms for communication with the different audiences.

| Subject	Course Code	COURSE OUTCOMES (CO)
Industrial and Technology Management	C301.1A	Students will be able to illustrate the fundamentals of managerial economics and management and differentiate various types of business organization.
	C301.3A	Students will be able to summarize the concept of technology management and Industrial management.
	C301.3A	Students will be able to explain the importance of IPR and role of Human Resource Management in an organization
	C301.4A	Students will be able to Understand the importance of Quality and its significance.
	C301.5A	Students will be able to describe the characteristics of marketing & its types and overview of financial Management.
	C301.6A	Students will be able to discuss the qualities of a good leader and road map to Entrepreneurship.
Power Electronics	C302.1A	Students will be able to explain the working principle and characteristics of SCR with different switching circuits & the working of GTO,TRIAC and GTO
	C302.2A	Students will be able to detremine the characteristics of MOSFET, IGBT ,Operating quadrants of chopper with its contol techniques and its applications
	C302.3A	Students will be able to explain the types of AC-DC power converters according to R, RL Load & the working of Single phase dual converter with its application
	C302.4A	Students will be able to explain the three phase AC-DC power converters and AC Voltage Regulator with respect to R, RL
	C302.5A	Students will be able to explain the DC-AC converters with its control technique
	C302.6A	Students will be able to explain three phase DC-AC power Converter by using computer-aided techniques & Multilevel Converter concept.
	C302.1B	Students will be able to determine VI characterstics SCR GTO and TRIAC.
	C302.2B	Students will be able to explain the single and three phase half and fully controlled AC-DC power converters
	C302.3B	Students will be able to determine characterstics of the AC Voltage regulator
	C302.4B	students will be able to illustrate modes of operatopn of Three phase voltage source inverter using 120 and 180 mode
Electrical Machines-II	C303.1A	Students will be able to explain the construction and working of alternators.
	C303.2A	Students will be able to analyze alternators under different operating conditions.
	C303.3A	Students will be able to determine performance parameters and applications of synchronous motor.
	C303.4A	Students will be able to demonstrate construction, working and applications of Induction generators, Induction motors and special purpose machines.
	C303.5A	Students will able to illustrate working and performance parameters of a. c. series motor.
	C303.6A	Students will be able to analyze working, applications and performance parameters of single phase Induction motor.
	C303.1B	Students will be able to calculate voltage regulation of Alternator by different methods.

	C303.2B	Students will be able to determine performance parameter of Synchronous Motor
	C303.3B	Student will be able to analyze performance of Single phase Induction Motor and speed control of three phase induction motor
	C303.4B	Student will be able to illustrate performance parameter of ac series motor through different loading Conditions.
Electrical Installation, Design and Condition Based Maintenance	C304.1A	Students will be able to classify Distribution system
	C304.2A	Students will be able to classify substation and earthing
	C304.3A	Students will be able to understand maintanance and condition monitoring methods with Advance tools and euipments for various electrical equipment's.
	C304.4A	Students will be able to demonstrate condition monitoring methods for various electrical equipment's testing methods of various electrical equipments
	C304.5A	Student will be able to design residential and commercial buildings lighting and estimate underground L.T Service line
	C304.6A	Students will be able to recall the basic aspects of Electrical Safety.
	C304.1B	Students will be able to design 132/220/400kv substation and earthing grid.
	C304.2B	Students will be able to analyse thermograph images
	C304.3B	Students will be able to explain construction ,working and troubleshooting of houshold and industrial electrical equipments.
	C304.4B	Students will be able to design earthing pit and earthing connection along with measurement of earth resistance for computer lab, Electrical Machines Lab, HT Substation.
Elective-I: Advanced Microcontroller and Embedded System	C305.1A	Students will be able to explain the architecture of PIC 18F458 microcontroller
	C305.2A	Students will be able to use ports and timers for peripheral interfacing and delay generation of PIC 18F458 microcontroller
	C305.3A	Students will be able to demonstrate special events using CCP module for PIC18F458 microcontroller
	C305.4A	Students will be able to explain interrupt structure in internal and external interrupt mode of PIC18F458 microcontroller
	C305.5A	Students will be able to describe ADC for parameter measurement and LCD interfacing using PIC18F458 microcontroller
	C305.6A	Students will be able to discuss serial communication and various serial communication protocols such as SPI and MODBUS
Seminar and Technical Communication	C306.1A	Students will be able to recognize current trends in electrical engineering.
	C306.2A	Students will be able to extend presentation and documentation skills.
	C306.3A	Students will be able to relate theoretical knowledge to actual industrial applications and research activity.
	C306.4A	Students will be able to explain analysis, planning, management and operations in electrical engineering field.
	C306.5A	Students will be able to communicate effectively.
	C306.6A	Students will be able to relate the facts with current technology and innovations in electrical engineering.
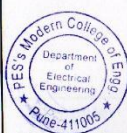
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Power System II	C307.1A	Students will be able to analyze power flow and performance of transmission line, line efficiency and compensation techniques.
	C307.2A	Students will be able to solve problems involving power handling capacity, design and performance of EHVAC power
	C307.3A	Students will be able to categorize load flow solutions to various power system networks using per unit system by computational technique & software tools.
	C307.4A	Students will be able to examine power system network under symmetrical fault and provide solutions considering protection of the transmission lines.
	C307.5A	Student will be able to examine power system network under unsymmetrical fault and provide solutions considering protection of the transmission lines.
	C307.6A	Students will be able to demonstrate knowledge of HVDC transmission systems and its control.
	C307.1B	Students will be able to analyze power flow and performance of transmission line, line efficiency and compensation techniques for reactive power management.
	C307.2B	Students will be able to examine power system network under symmetrical & unsymmetrical faults.
	C307.3B	Students will be able to demonstrate knowledge of HVDC transmission systems and its control.
	C307.4B	Students will be able to use Power system softwares viz. MATLAB, SCILAB for simulation and programming
Computer Aided Design of Electrical Machines	C308.1A	Students will be able to Summarize temperature rise, methods of cooling of transformer and consider IS 2026 in transformer design.
	C308.2A	Students will be able to evaluate main dimensions of transformer for minimum cost and minimum loss design, temperature rise and cooling scheme.
	C308.3A	Students will be able to determine the performance parameters, Calculate of mechanical force of transformer and describe Computer aided design of transformer.
	C308.4A	Students will be able to develop AC winding using modern tools and determine main dimensions and design stator of three phase induction motor.
	C308.5A	Students will be able to design rotor & air gap and of three phase induction motor.
	C308.6A	Students will be able to determine various leakage reactance and performance parameters of three phase induction motorImplement and develop computer aided design of induction motor.
	C308.1B	Students will be able to design single phase transformer and calculate its performance parameters.
	C308.2B	Students will be able to design AC winding for 3 phase induction motor.
	C308.3B	Students will be able to describe various partsof three phase induction motor and their function.
	C308.4B	Students will be able to use CAD and FEA software and use them for design of transformer and three phase induction motor.
Control	C309.1A	Students will be able to understand basic concepts of the classical control theory

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System Engineering	C309.2A	Students will be able to explain the behaviour of control system by time domain specifications and using modern tool.
	C309.3A	Student will be able to model physical systems mathematically in time domain and determine its stability.
	C309.4A	Student will be able to determine stability of system using Polar and Nyquist Plot in frequency domain.
	C309.5A	Student will be able to determine stability of system using Bode Plot in frequency domain.
	C309.6A	Student will be able to design PID controller to meet desired performance specifications.
	C309.1B	Students will be able to evaluate the time domain and frequency domain response for a electrical circuit
	C309.2B	Students will be able to analyze system stabilty using a) Bode plot b) Root locus c) Nyquist plot using software by adding poles and zeros to the system.
	C309.3B	Students will be able to describe analysis of close loop DC position control system using PID controller.
	C309.4B	Students will be able to explain transfer function of any physical systems and effect of P,PI, PID on Time response of second order system.
Energy Management	C310.1A	Students will be able to explain the knowledge of BEE energy policies and energy Acts
	C310.2A	Student can understand role and responsibilities of Energy manager they can list and apply demand side management measures for managing utility systems.
	C310.3A	Student can use simple data analytic tools.
	C310.4A	Student can demonstrate use of varies energy audit instruments
	C310.5A	Student can analyze economy feasibility of energy conservation projects
	C310.6A	Students can identify appropriate energy conservations methods for electric and thermal utilities.
Elective-II: Electric Mobility	C311.1A	Students will be able to analyze the concepts of Hybrid and Electric vehicles.
	C311.2A	Students will be able to describe the different types of energy storage systems
	C311.3A	Students will be able to comprehend the knowledge of the battery charging and management systems
	C311.4A	Students will be able to classify the different mode of operation for hybrid vehicle
	C311.5A	Students will be able to apply the different Charging standards used for electric vehicles.
	C311.6A	students will be able to differentiate between Vehicle to home & Vehicle to grid concepts.