Electrical Engineering Program			
YEAR	**COURSE CODE**	**COURSE NAME**	**COURSE OUTCOMES**
SE TermI	203142	Material Science	Categorize and classify different materials from Electrical Engineering Applications point of view
			Understand the properties and applications of Insulating materials
			Explain and summarize various properties and characteristics of magnetic and conducting materials
			Choose materials for applications in Electrical Equipments
			Understand and Explain about Nanotechnology, Batteries and Solar Cell materials
			Test different classes of materials as per I.S.
	203143	Analog and Digital Electronics	Understand concept of Number systems ,perform binary arithmetic and reduce Boolean expressions by K- Map
			Design combinational and sequential logic circuits using K-map
			Demonstrate the use of operational amplifiers & its applications
			Apply the knowledge of Op-amp as wave form generators & first order filter analysis
			Application of BJT as Amplifier
			Analysis of single and three phase diode (uncontrolled) rectifiers
	203144	Electrical Measurement and Instrumentation	Deliver knowledge of classification of measuring instrument with their characteristics.
			Understand instrument transformers, their terminologies and range extension methods using instrument transformers
			Demonstrate measuring techniques for electrical parameters like resistance, inductance, and capacitance.
			Apply different methods for measurement of Power in AC circuit and demonstrate use of Energy meter and its calibration
			Understand construction,front panel of CRO and its use.
			Demonstrate the knowledge of different electrical transducers for measurement of non-electrical parameters
	203141	Power Generation Technologies	To understand the operations of thermal power plant with all accessories and cycles
			Be aware of the principle of operation, components, layout, location, environmental and social issues of nuclear, diesel and gas power plant
			To identify and demonstrate the components of hydro power plant and calculation of turbine required based on catchment area
			Find the importance of wind based energy generation along with its design, analysis and comparison.
			To apply solar energy in thermal and electrical power generation considering energy crisis, environmental and social benefits.
			Understand the operation of electrical energy generation using biomass, tidal, geothermal, hydel plants, fuel cell and interconnection with grid.
	207006	Engineering Mathematics III	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
			Apply Laplace Transform technique to solve differential equations invovled in electrical circuits and related electrical engineering problems.
			Solve problems related to Fourier transform, Z-Transform and applications to Signal processing and Control systems.
			Perform vector differentiation , analyze the vector fields and apply to Electro-Magnetic fields.
			Perform vector integration , analyze the vector fields and apply to Electro-Magnetic fields.
			Analyze conformal mappings, transformations and perform contour integration ofcomplex functions in the study of electrostatics and signal processing.

SE TermII	203145	Power System I	Identify different patterns of load curve, calculate different factors associated with it and tariff structure for LT and HT consumers and calculate energy bill
			Identify and able to distinguish insulators for different location of power system.
			Analyze and apply the knowledge of electrical and mechanical design of transmission lines and able to calculate sag of transmission line
			Calculate GMR, GMD, and Inductance of bundle conductors.
			Illustrate effect of capacitance on performance of transmission lines.
			Determine the performance of transmission lines.
	203146	Electrical Machines I	To understand Construction and working of single phase transformer and to analyze its performance
			To understand Construction and working of Three phase transformer and to study different types of connection.
			To understand the construction, principle of operation of, DC Machine
			To test & analyze the performance of DC machine and to study the commutation.
			To understand the construction, principle of operation of Induction Motor.
			To test & analyze the performance of Induction motor .
	203147	Network Analysis	Table to analyse circuit system using direct application of Kirchooff's current
			able to solve for network solution using principles of Network theorems
			able to compute time response in RL, RC and RLC circuits
			able to get network solutions using laplace transforms
			able to determine all characteristic parameters of 2-port networks
			able to determine all characteristic parameters of 2-port networks
	203148	Numerical Methods and Computer Programming	Differentiate between different types of errors in computation and understand significant digits
			Develop algorithms and implement programs using Python for numerical methods.
			Distinguish between the different types of equations given and execute the appropriate numerical method to solve the equation.
			Apply different numerical methods for interpolation, differentiation and numerical integration.
			Solve the first and second order ODE using the appropriate numerical method
			Apply and compare various numerical methods to solve linear simultaneous equations.
	203149	Fundamentals of Microcontroller and its Applications	describe the architecture of 8051 and compare the features of various types of microcontrollers
			Identify the addressing modes of the 8051 microcontroller and execute programs in assembly language
			develop programs in C language for microcontroller 8051
			to write programs using serial communication protocol for serial data exchange
			interface real world sensors and control physical processes/systems
	303141	Industrial and Technology Management	Differentiate between different types of business organizations and discuss the fundamentals of economics and management.
			Explain the importance of technology management and quality management.
			Explain the importance of IPR and role of Human Resource Management.
			Understand the importance of Quality and its significance.
			Describe the characteristics of marketing & its types and overview of financial Management
			Discuss the qualities of a good leader and road map to Entrepreneurship
	303142	Power Electronics	Explain and analyze the characteristics of SCR & Triac and derive the characteristics by conducting experiment and able to demonstrate Triac application for light dimmer.
			Explain and analyze the characteristics of MOSFET & IGBT and analyze the working principle of DC-DC Converters with different control strategies
			Analyze the operation of single phase AC-DC Converters with R & RL loads and able to demonstrate converter application for speed control of DC motor
			Analyze the operation of three phase AC-DC Converter and AC-AC Converter with R & RL loads
			Analyze the operation of Single phase DC-AC Converters with different voltage control techniques and able to demonstrate inverter application for UPS
			Analyze the operation of Three phase DC-AC Converters and explain the concept of Multi level inverter and inverter application for speed control of AC motor

TE TermI	303143	Electrical Machines II	Understand construction working of Alternator & solve numerical on alternator
			Develop vector diagrams & understand methods for regulation calculations of alternator experimentally
			Understand operation of 3 phase Synchronous Motor, vector diagram & its power flow
			Understand different speed control methods of 3 phase Induction Motor
			Learn construction, working principle and characteristics of A.C. Series Motor
			Determine equivalent circuit parameters & performance characteristics of 1 ph Induction Motor
	303144	Electrical Installation Design and Condition based Maintainance	Classify distribution system and its types, Understand the design considerations of distribution feeders and Design economic choice of conductor using Kelvin's Law
			Compare and classify various earthing systems and substation busbar arrangements and illustrate using Autocad software
			Explain and analyse maintenance and condition monitoring of various electrical equipments.
			Understand and analyze the different parameters to Estimate the cost of electrical wiring system for a given load
			Estimation and Costing of distribution systems
			Apply Electrical safety procedures and understand the different testing methods.
	303145	Elective I Advance Microcontroller and Its Applications	Explain architecture of PIC18F458 microcontroller its instructions and addressing modes
			Use port and timers for peripheral interfacing and delay generation
			Interface special and generate event using CCP module
			Effectively use interrupt structure in internal and external interrupt mode
			Exffectively use ADC for parameter measurement and also understand LCD interfacing
			Use serial communication and various serial communication protocol
	303146	Seminar	Review research papers on contemporary areas applied to industry and research
			Discuss and critical think on the selected topic
			Recognize the latest trends of various state of the art technologies
			Improve presentation and documentation skills
TE TermII	303148	Power System II	To understand concept of complex power.
			To understand concept of EHV AC Transmission Systems.
			To reduce power system network using per unit system and analyze load flow problems.
			To analyse symmetrical fault on electrical power systems.
			To analyse unsymmetrical faults on different electrical equipments.
			To study HVDC Transmission systems.
	303149	Computer aided Design of Electrical Machines	Summarize temperature rise, methods of cooling of transformer and consider IS 2026 in transformer design.
			Design the overall dimensions of the transformer.
			Analyze the performance parameters of transformer.
			Design overall dimensions of three phase Induction motor
			Analyze the performance parameters of three phase Induction motor.
			Implement and develop computer aided design of transformer and induction motor.
	303150	Control System Engineering	Construct mathematical model of Electrical and Mechanical system using differential equations and transfer function and develop analogy between Electrical and Mechanical systems.
			Determine time response of systems for a given input and perform analysis of first and second order systems using time domain specifications.
			Investigate closed loop stability of system in s-plane using Routh Hurwitz stability criteria and root locus.
			Analyze the systems in frequency domain and investigate stability using Nyquist plot
			Analyze the systems in frequency domain and investigate stability using Bode plot
			Design PID controller for a given plant to meet desired time domain specifications.
	303151	Elective I Electric Mobility	Analyze the concepts of Hybrid and Electric vehicles
			Describe the different types of energy storage systems
			Comprehend the knowledge of the battery charging and management systems
			Classify the different mode of operation for hybrid vehicle
			Apply the different Charging standards used for electric vehicles
			Differentiate between Vehicle to home & Vehicle to grid concepts
	303150	Energy Audit and	Understand Importance of Energy Conservation and Energy Security

		Management	Understand Impact of Energy Usage on Environment & emission standards
			Follow format of Energy Policy
			Illustrate procedure and tools of Energy Audit
			Calculate Energy Consumption and Saving options with economic feasibility
			Perform Cost Benefit Analysis for Energy Conservation Projects

BE TermI	403141	Power System Operation and Control	To analyse system stability under different transient conditions with equal area criterion.
			To understand concept of reactive power compenstaion and FACTS Technology.
			To analyse different frequency contrtol strategies used in power system.
			To formualte unit commitment and economic load dispatch problem.
			To illustarte various ways of interchange of power between various utilities.
			To undesratnd the concept of Volatge stability and stability index
	403142	Advance Control System	Design a lead or lag network in frequency domain to satisfy the given specifications of the system
			Find the stability of a nonlinear system using describing function/Lyapunov stability method
			Model a physical system into the state space form
			Design controller and observer for a system
			Apply the principles of sampling, signal reconstruction to find the stability of a system in the z domain
			Design advanced controllers like Sliding mode control, adaptive control and LQR control
	303143	Programmable Logic Controller and SCADA	Develop and explain the working of PLC with the help of a block diagram.
			Classify input and output interfacing devices with PLC.
			Develop architecture of SCADA and explain the importance of SCADA in critical infrastructure.
			Execute, debug and test the programs developed for digital and analog operations
			Describe various SCADA protocols along with their architecture.
			Observe development of various industrial applications using PLC and SCADA.
	403144A	Power Quality	To develop ability to identify various power quality issues
			To Understand relevant IEEE standards
			To illustrate various power quality monitoring techniques and instruments
			To learn and characterize various PQ problems
			To identify different mitigation techniques
			To Study of filters, various mitigation circuits/devices/equipments
	403144B	Electric Hybrid Vehicle	explain different chemistry technologies of Lithium Ion Battery
			Understand and explain Electrical model of Li-ion battery and simulate it using MATLAB
			understand and explain EV Sub system Configurations and Energy management strategies
			Comprehend the knowledge of drivetrain hybridization.
			Evaluate EV motor sizing and to design Battery bank
			Classify Battery Recycling methods.
	403148	Switchgear Protection	Understand fundamentals of protective relaying and working principles of relays.
			Demonstrate the arc interruption theories and analyse the expression for restriking voltage and RRRV.
			Explain Construction, and working of different HV /LV circuit breakers and their laboratory testing .
			Explain the characteristics of static and digital relays and their applications in power systems.
			Demonstrate protection schemes for transformer,induction motor and alternator. and busbar
			Demonstrate transmission line protection schemes using distance relay
	403149	Advance Electric Drives and Control	Explain the dynamics of a motor-load system in all four quadrants of speed-Torque plane
			Demonstrate different braking methods of DC motors and Analyze the operation of converter, chopper fed dc drives.
			Demonstrate different braking methods of AC motors and Analyze the operation of Inverter fed Induction drives
			Analyze the modern AC drives and Classify various classes of motor duty.
			Understand and Analyze inverter fed Synchronous drives
			Select and demostrate the modes of operation of drive in various applications.
	403151	Project Stage 1 and II	Work in team and ensure satisfactory completion of project in all respect.
			Handle different modern tools and apply Engineering knowledgeto complete the given task and to acquire specified knowledge in the area of interest.
			Provide solution to the current issues faced by the society.
			develop ability of self learning and life long learning

			Communicate effectively findings in verbal and written forms
			Practice moral and ethical value while completing the given task.