Department of Electrical Engineering

Course Outcomes

SE – 2015 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – III			
203141	**Power Generation Technologies**	CO1	Identify operations of thermal power plant with all accessories and cycles.
		CO2	Be aware of the principle of operation, components, layout, location, environmental and
		CO3	Identify and demonstrate the components of hydro power plant and calculation of turbine
		CO4	Find the importance of wind based energy generation along with its design, analysis and
		CO5	Apply solar energy in thermal and electrical power generation considering energy crisis,
		CO6	Understand the operation of electrical energy generation using biomass, tidal, geothermal,
207006	**Engineering Mathematics-III**	CO1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
		CO2	Solve problems related to Laplace transform, Fourier transform, Z-Transform and applications to Signal processing and Control systems.
		CO3	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
		CO4	Analyze conformal mappings, transformations and perform contour integration of
		CO5	complex functions in the study of electrostatics and signal processing.

		CO6	
203142	**Material Science**	CO1	Categorize and classify different materials from Electrical Engineering applications
		CO2	point of view.
		CO3	Explain and summarize various properties and characteristics of different classes of materials.
		CO4	Choose materials for application in various electrical equipment.
		CO5	Explain and describe knowledge of nanotechnology, batteries and solar cell materials.
		CO6	Test different classes of materials as per IS.
203143	**Analog And Digital Electronics**	CO1	Understand conversion of number system, perform binary arithmetic and reduce Boolean expressions by K- Map.
		CO2	Demonstrate basics of various types of Flip flops, design registers and counter.
		CO3	Analyze parameter of Op-amp and its applications.
		CO4	Apply the knowledge of Op-amp as wave form generators & filters.
		CO5	Use BJT as amplifier with various configurations.
		CO6	Analysis of uncontrolled rectifier.
203144	**Electrical Measurements and Instrumentation**	CO1	Understand various characteristics of measuring instruments, their classification and range extension technique.
		CO2	Classify resistance, apply measurement techniques for measurement of resistance, inductance.
		CO3	Explain construction, working principle and use of dynamometer type wattmeter for measurement of power under balance and unbalance condition.
		CO4	Explain Construction, working principle of 1-phase and 3-phase induction, static energy meter and calibration procedures.
		CO5	Use of CRO for measurement of various electrical parameters, importance of transducers, their

			classification, selection criterion and various applications.
		CO6	Measurement of various physical parameters using transducers.
203151	**Soft Skills**	CO1	DoSWOT analysis.
		CO2	Develop presentation and take part in group discussion.
		CO3	Understand andImplement etiquettes in workplace and in society at large.
		CO4	Work in team with team spirit.
		CO5	Utilize the techniques for time management and stress management.
203154	**Solar Thermal Systems**	CO1	Differentiate between types of solar Concentrators
		CO2	Apply software tool for solar concentrators
		CO3	Design different types of Solar collectors and balance of plant
		CO4	
		CO5	
SE – 2015 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – IV			
203145	**Power System I**	CO1	Recognize different patterns of load curve, calculate different factors associated with it and tariff structure for LT and HT consumers.
		CO2	Aware of features, ratings, application of different electrical equipment in power
		CO3	station and selection of overhead line insulators.
		CO4	Analyze and apply the knowledge of electrical and mechanical design of transmission lines.
		CO5	Identify and analyze the performance of transmission lines.
203146	**Electrical Machines I**	CO1	Apply energy conversion principles to different

			machines.
		CO2	Select machine for specific applications
		CO3	Test the various machine for performance calculation.
203147	**Network Analysis**	CO1	Developing strong basics for network theory.
		CO2	Develop the problem solving technique for networks by application of theorems.
		CO3	Understand the behavior of the network by analyzing its transient response.
		CO4	Apply their knowledge of network theory for designing special circuits like filters.
203148	**Numerical Methods and Computer Programming**	CO1	Develop algorithms and implement programs using C language for various numerical methods.
		CO2	Demonstrate types of errors in computation and their causes of occurrence.
		CO3	Identify various types of equations and apply appropriate numerical method to solve different equations.
		CO4	Apply different numerical methods for interpolation, differentiation and numerical integration.
		CO5	Apply and compare various numerical methods to solve first and second order ODE
		CO6	Apply and compare various numerical methods to solve linear simultaneous equations.
203149	**Fundamentals of Microcontroller and Applications**	CO1	Differentiate between microprocessor and microcontroller.
		CO2	Describe the architecture and features of various types of microcontroller.
		CO3	Demonstrate programming proficiency using the various addressing modes and all types of instructions of the target microcontroller.
		CO4	Program using the capabilities of the stack, the program counter the internal and external memory, timer and interrupts and show how these are used to execute a programme.

		CO5	Write assemble assembly language programs on PC and download and run their program on the training boards.
		CO6	Design electrical circuitry to the Microcontroller I/O ports in order to interface with external devices.
203155	**Audit Course II**	CO1	Will be able to do design of Solar PV system for small and large installations
		CO2	Will be able to handle software tools for Solar PV systems

Department of Electrical Engineering

Course Outcomes

TE – 2015 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester –V			
311121	**Industrial And Technology Management**	CO1	Differentiate between different types of business organization and discuss the fundamentals of economics and management.
		CO2	Explain the importance of technology management and quality management.
		CO3	Describe the characteristics of marketing and its types.
		CO4	Discuss the qualities of a good leader.
303141	**Advance Microcontroller and its Applications**	CO1	Explain architecture of PIC18F458 microcontroller, its instructions and the addressing modes.
		CO2	Develop and debug program in assembly language or C language for specific applications
		CO3	Use of an IDE for simulating the functionalities of PIC microcontroller and its use for software and hardware development
		CO4	Interface a microcontroller to various devices.
		CO5	Effectively utilize advance features of microcontroller peripherals.
303142	**Electrical Machines II**	CO1	Explain construction & working principle of three phase synchronous machines
		CO2	Estimate regulation of alternator by direct and indirect methods.
		CO3	Demonstrate operation of synchronous motor at constant load and variable excitation (v curves & ∧ curves) & constant excitation and variable load.
		CO4	Explain Speed control methods of three phase

			induction motor.
		CO5	Plot circle diagram of ac series motor
		CO6	Obtain equivalent circuit of single phase induction motor by performing no load & blocked rotor test.
303143	**Power Electronics**	CO1	Develop characteristics of different power electronic switching devices
		CO2	Reproduce working principle of power electronic converters for different types of loads
		CO3	Analyze the performance of power electronic converters
303144	**Electrical Installation, Maintenance and Testing**	CO1	Classify distribution systems, its types and substations
		CO2	Design of different earthing systems for residential and industrial premises
		CO3	Select methods of condition monitoring and testing of various Electrical Equipments
		CO4	Estimate and Costing of residential and industrial premises
303145	**Seminar and Technical Communication**	CO1	Relate with the current technologies and innovations in Electrical engineering.
		CO2	Improve presentation and documentation skill.
		CO3	Apply theoretical knowledge to actual industrial applications and research activity.
		CO4	Communicate effectively.
TE – 2015Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – VI			
303146	**Power System II**	CO1	Solve problems involving modelling, design and performance evaluation of HVDC and EHVAC power transmission lines.
		CO2	Evaluate power flow in power transmission networks and apply power flow results to solve simple planning problems.

		CO3	Calculate currents and voltages in a faulted power system under both symmetrical and asymmetrical faults, and relate fault currents to circuit breaker ratings.
303147	**Control System-I**	CO1	Model physical system,
		CO2	Determine time response of linear system
		CO3	Analyze stability of LTI system
		CO4	Design PID controller for LTI system
303148	**Utilization of Electrical Energy**	CO1	Ensure that the knowledge acquired can be applied in various fields such as electric heating, illumination, chemical processes, and electric traction.
		CO2	Make the students aware about the importance of maximizing the energy efficiency by optimum utilization of electrical energy.
		CO3	Calculate tractive effort, power, acceleration and velocity of traction.
		CO4	Provide know how about Refrigeration, Air Conditioning
		CO5	Understand collection of technical information and delivery of this technical information through presentations.
		CO6	Develop self and lifelong learning skills, introduce professionalism for successful career.
303149	**Design of Electrical Machines**	CO1	Calculate main dimensions and Design of single phase and three phase transformer.
		CO2	Calculate main dimensions of three phase Induction motor.
		CO3	Determine the parameters of transformer.
		CO4	Determine parameters of three phase Induction motor.
303150	**Energy Audit and Management**	CO1	To get knowledge of BEE Energy policies, Electricity Acts.
		CO2	Use various energy measurement and audit instruments.
		CO3	Carry out preliminary energy audit of various sectors

		CO4	Enlist energy conservation and demand side measures for electrical, thermal and utility Systems.
		CO5	Solve simple problems on cost benefit analysis.
303151	**Electrical Workshop**	CO1	Integrate electrical/electronic circuits for useful applications
		CO2	Acquire hardware skills to fabricate circuits designed.
		CO3	Read data manuals/data sheets of different items involved in the circuits.
		CO4	Test and debug circuits.
		CO5	Produce the results of the testing in the form of report.

Department of Electrical Engineering

Course Outcomes

BE – 2015 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester –VII			
40314	**Power System Operation and Control**	CO1	Identify and analyze the dynamics of power system and suggest means to improve stability of system.
		CO2	Comprehend the effect of reactive power on Power system and suggest the suitable means of reactive power management.
		CO3	Selection of appropriate FACTs devices
		CO4	Analyze the generation-load balance in real time operation and its effect on frequency and develop automatic control strategies with mathematical relations.
		CO5	Formulate objective functions for optimization tasks such as unit commitment and economic load dispatch and get solution using computational techniques.
		CO6	Evaluate reliability indices of Power system
403142	**PLC and SCADA Applications**	CO1	Develop block diagram of PLC and explain the working.
		CO2	Classify input and output interfacing devices with PLC.
		CO3	Develop architecture of SCADA and explain the importance of SCADA in critical infrastructure.
		CO4	Execute, debug and test the programs developed for digital and analog operations.
		CO5	Describe various SCADA protocols along with their architecture.

		CO6	Observe development of various industrial applications using PLC and SCADA.
403143	**Fundamentals of Microcontroller MSP430 and its Applications [Open Elective]**	CO1	Explain architecture of MSP430 microcontroller, its instructions and the addressing modes.
		CO2	Develop and debug program in C language for specific applications.
		CO3	Use of Code Composer Studio IDE for simulating the functionalities of MSP430 microcontroller
		CO4	Interface microcontroller MSP430 to various sensing devices.
		CO5	Develop IoT based application using MSP430.
403144	**Electric and Hybrid Vehicles**	CO1	Review history, Social and environmental importance of Hybrid and Electric vehicles.
		CO2	Describe the performance and selection of energy storage systems and Analyze battery management system.
		CO3	Distinguish between the performance and architecture of various drive trains.
		CO4	Describe the different Instrumentation and Control used for electric vehicles.
		CO5	Differentiate between Vehicle to Home, Vehicle to Vehicle and Vehicle to Grid energy systems concepts.
403145	**Control System II**	CO1	Recognize the importance of digital control system.
		CO2	Derive pulse transfer function.
		CO3	Analyze digital controllers.
		CO4	Convert system in state space format.
		CO5	Solve state equation.
		CO6	Design observer for system.
403152	**Hydro Energy Systems**	CO1	Explain and differentiate various types of hydro electric generators; pico, micro and small hydro

BE – 2015 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – VIII			
403147	**Switchgear and Protection**	CO1	Describe arc interruption methods in circuit breaker.
		CO2	Derive expression for restriking voltage and RRRV in circuit breaker
		CO3	Explain construction and working of different high voltage circuit breakers such as ABCB, SF6 CB, and VCB.
		CO4	Classify and Describe different type of relays such as over current relay, Reverse power relay, directional over current relay, Differential relay, Distance relay, Static relay and numerical relay
		CO5	Describe various protection schemes used for transformer, alternator and busbar
		CO6	Describe transmission line protection schemes.
403148	**Power Electronic Controlled Drives**	CO1	Explain motor load dynamics and multi quadrant operation of drives
		CO2	Analyze operation of converter fed and chopper fed DC drives.
		CO3	Describe braking methods of D.C. and induction motor drive.
		CO4	Explain vector control for induction motor drives
		CO5	Describe synchronous motor drive.
		CO6	Identify classes and duty cycles of motor and applications of drives in industries
403149	**High Voltage Engineering**	CO1	Identify, describe and analyze the breakdown theories of solid, liquid and gaseous materials
		CO2	Describe as well as use different methods of generation of high AC, DC, impulse voltage and

			current.
		CO3	Demonstrate and use different methods of measurement of high AC, DC, impulse voltage and current.
		CO4	Identify the occurrence of overvoltage and to provide remedial solutions
		CO5	Demonstrate an ability to carry out different tests on high voltage equipment and devices as well as ability to design the high voltage laboratory with all safety measures
403150	**Smart Grid**	CO1	Apply the knowledge to differentiate between Conventional and Smart Grid.
		CO2	Identify the need of Smart Grid, Smart metering, Smart storage, Hybrid Vehicles, Home Automation, Smart Communication, and GIS
		CO3	Comprehend the issues of micro grid
		CO4	Solve the Power Quality problems in smart grid
		CO5	Apply the communication technology in smart grid
403150	**Illumination Engineering**	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.
403151	**Project II**	CO1	Work in team and ensure satisfactory completion of project in all respect.
		CO2	Handle different tools to complete the given task and to acquire specified knowledge in area of interest.
		CO3	Provide solution to the current issues faced by the society.
		CO4	Practice moral and ethical value while completing the given task.

		CO5	Communicate effectively findings in verbal and written forms.

Department of Electrical Engineering

Course Outcomes

SE – 2019 Course			
Course Code	**Course Name**	**Course Outcomes**	
Semester – III			
203141	**Power Generation Technologies**	CO1	Identify operations of thermal power plant with all accessories and cycles.
		CO2	Be aware of the principle of operation, components, layout, location, environmental and
		CO3	Identify and demonstrate the components of hydro power plant and calculation of turbine
		CO4	Find the importance of wind based energy generation along with its design, analysis and
		CO5	Apply solar energy in thermal and electrical power generation considering energy crisis,
		CO6	Understand the operation of electrical energy generation using biomass, tidal, geothermal,
207006	**Engineering Mathematics-III**	CO1	Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
		CO2	Solve problems related to Laplace transform, Fourier transform, Z-Transform and applications to Signal processing and Control systems.
		CO3	Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
		CO4	Analyze conformal mappings, transformations and perform contour integration of
		CO5	complex functions in the study of electrostatics and signal processing.
		CO6	
203142	**Material Science**	CO1	Categorize and classify different materials from Electrical Engineering applications
		CO2	point of view.

		CO3	Explain and summarize various properties and characteristics of different classes of materials.
		CO4	Choose materials for application in various electrical equipment.
		CO5	Explain and describe knowledge of nanotechnology, batteries and solar cell materials.
		CO6	Test different classes of materials as per IS.
203143	**Analog And Digital Electronics**	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
203144	**Electrical Measurements and Instrumentation**	CO1	Understand various characteristics of measuring instruments, their classification and range extension technique.
		CO2	Classify resistance, apply measurement techniques for measurement of resistance, inductance.
		CO3	Explain construction, working principle and use of dynamometer type wattmeter for measurement of power under balance and unbalance condition.
		CO4	Explain Construction, working principle of 1-phase and 3-phase induction, static energy meter and calibration procedures.
		CO5	Use of CRO for measurement of various electrical parameters, importance of transducers, their classification, selection criterion and various applications.
		CO6	Classify transducer and apply it for measurement of physical parameters in real time.
203150	**Applications of Mathematics**	CO1	Apply fundamentals of mathematics in solving electrical engineering problem
		CO2	Analyze complex electrical engineering problem using

	in Electrical Engineering		mathematical techniques.
		CO3	Implement program and simulation for problems in electrical engineering.
		CO4	Demonstrate self lifelong learning skills with applications of mathematics in electrical engineering through software.
203151	**Soft Skills**	CO1	DoSWOT analysis.
		CO2	Develop presentation and take part in group discussion.
		CO3	Understand andImplement etiquettes in workplace and in society at large.
		CO4	Work in team with team spirit.
		CO5	Utilize the techniques for time management and stress management.
203152	**Audit Course-III Solar Thermal System**	CO1	Differentiate between types of solar Concentrators
		CO2	Apply software tool for solar concentrators
		CO3	Design different types of Solar collectors and balance of plant

SE – 2019 Course

Course Code	**Course Name**	**Course Outcomes**	
Semester – IV			
203145	**Power System I**	CO1	Recognize different patterns of load curve, calculate different factors associated with it and tariff structure for LT and HT consumers.
		CO2	Aware of features, ratings, application of different electrical equipment in power
		CO3	station and selection of overhead line insulators.
		CO4	Analyze and apply the knowledge of electrical and mechanical design of transmission lines.
		CO5	Identify and analyze the performance of transmission lines.
203146	**Electrical Machines I**	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.
203147	**Network Analysis**	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 stead 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
203148	**Numerical Methods and Computer Programming**	CO1	Demonstrate types of errors in computation and their causes of occurrence.
		CO2	Calculate root of algebraic and transcendental equations using various methods.
		CO3	Identify various types of equations and apply appropriate numerical method to solve different equations.
		CO4	Solve linear simultaneous equation using direct and indirect method.
		CO5	Develop algorithms and write computer programs for various numerical methods.
203149	**Fundamentals of Microcontroller and Applications**	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	Demonstrate programming proficiency using the various addressing modes and all types of instructions of the target microcontroller.
		CO4	Program using the capabilities of the stack, the program counter the internal and external memory, timer and interrupts and show how these are used to execute a programme.

		CO5	Write assemble assembly language programs on PC and download and run their program on the training boards.
		CO6	Interface input output devices and measure electrical parameters with 8051 in real time.
203152	**Project Based Learning**	CO1	Identify, formulate, and analyze the simple project problem.
		CO2	Apply knowledge of mathematics, basic sciences, and electrical engineering fundamentals to develop solutions for the project.
		CO3	Learn to work in teams, and to plan and carry out different tasks that are required during a project.
		CO4	Understand their own and their team-mate's strengths and skills.
		CO5	Draw information from a variety of sources and be able to filter and summarize the relevant points.
		CO6	Communicate to different audiences in oral, visual, and written forms.
203153	**Audit Course-IV**	CO1	Will be able to do design of Solar PV system for small and large installations
		CO2	Will be able to handle software tools for Solar PV systems