## Electrical Engineering Department

## Course Outcomes (COs)

## S.E. Electrical Engineering (2015 Course)

| Course Code: 203141 | |
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| **Name of Course: Power Generation Technologies** | |
| C201.1 | Demonstrate the operations of thermal power plant with all accessories and thermodynamic cycles. |
| C201.2 | Explain the main components and working of nuclear, diesel, and gas power plant. |
| C201.3 | Discuss general arrangements and operation of the hydro power plant. |
| C201.4 | Analyze the wind turbine energy, economics, and its impact on the environment. |
| C201.5 | Apply solar energy in thermal and electric power generation considering the energy crisis, environmental, and social benefits. |
| C201.6 | Understand the operation of electrical energy generation using biomass, tidal, geothermal, hydel plants, fuel cell and interconnection with grid. |

| Course Code: 207006 | |
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| **Name of Course: Engineering Mathematics - III** | |
| C202.1 | Solve higher order linear differential equation and apply the knowledge of higher order linear differential equation to model and analyze electrical circuits. |
| C202.2 | Apply Laplace Transform to solve problems related to signal processing and control systems. |
| C202.3 | Apply Fourier transform and Z-Transform to solve problems related to signal processing and control systems. |
| C202.4 | Apply statistical tools and the concepts of probability to analyse and interprete the data related to energy management and electrical systems |
| C202.5 | Apply the knowledge of vector calculus to analyze the vector fields |
| C202.6 | Analyze Complex functions, conformal mappings, and perform contour integration in the study of electrostatics, signal and image processing. |

| Course Code: 203142 | |
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| **Name of Course: Material Science** | |
| C203.1 | Categorize dielectric and optical properties of materials used in Electrical Engineering applications. |
| C203.2 | Distinguish between solid, liquid, and gaseous insulating materials in terms of properties, breakdown strength, and applications in Electrical Engineering. |
| C203.3 | Select magnetic materials for Electrical Engineering Applications |
| C203.4 | Test and analyze conducting materials for motor windings, transmission lines, cables, lamp filaments, solders, fuses, bi metallic relay, thermocouples, super capacitors, and |

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| | super conductors. |
| C203.5 | Explain nanotechnology, and material required for batteries in Electric and hybrid electric vehicles. |
| C203.6 | Test solid and liquid insulating materials as per IS 13585-1994, IS-2584, IS-6798. |

| **Course Code: 203143** | |
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| **Name of Course: Analog and Digital Electronics** | |
| C204.1 | Understand conversion of number system, perform binary arithmetic, and reduce Boolean expressions by K-map. |
| C204.2 | Demonstrate basics of various types of flip-flops, design registers, and counter. |
| C204.3 | Analyze parameter of OP-amp, and its applications. |
| C204.4 | Apply OP-amp as waveform generators, filters and regulators. |
| C204.5 | Explain BJT as an amplifier for direct coupled, RC coupled, transformer coupled, Darlington pair, push pull amplifier, and differential amplifier configurations. |
| C204.6 | Analyze single phase and three phase half wave and full wave diode and precision rectifier. |

| **Course Code: 203144** | |
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| **Name of Course: Electrical Measurements and Instrumentation** | |
| C205.1 | Understand the characteristics of measuring instruments, their classification, and range extension techniques. |
| C205.2 | Classify and apply measurement techniques for the measurement of resistance, inductance and capacitance. |
| C205.3 | Analyze active and reactive power management in three phase systems for balanced and unbalanced load using three wattmeter, two wattmeter, and one wattmeter method. |
| C205.4 | Test and analyze electrical energy measurement using electromechanical and static energy meter for single phase and three phase. |
| C205.5 | Measure electrical quantities, circuit elements and pressure using CRO and transducers respectively. |
| C205.6 | Classify transducers and apply for the measurement of physical parameters in real time for level measurement and displacement measurement. |

| **Course Code: 203151** | |
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| **Name of Course: Soft Skill** | |
| C206.1 | Do SWOC analysis. |
| C206.2 | Develop presentation and take part in-group discussion. |
| C206.3 | Understand and implement etiquette in workplace and in society. |
| C206.4 | Develop and strengthen interpersonal relationship through teamwork and group discussion. |
| C206.5 | Work in team with team spirit. |
| C206.6 | Utilize the techniques for time management and stress management. |

| **Course Code: 203145** |
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| **Name of Course: Power System-I** | |
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| C207.1 | Recognize the load curve patterns of a generating station and analyze tariff structure for LT and HT consumers. |
| C207.2 | Describe specifications of electrical equipment in power station. |
| C207.3 | Design electrical and mechanical aspects of overhead transmission line and underground cables. |
| C207.4 | Determine the resistance, inductance, capacitance, GMR and GMD of transmission line for three phase single circuit and double circuit with symmetrical and unsymmetrical spacings. |
| C207.5 | Determine the resistance, inductance, capacitance, GMR and GMD of transmission line for three phase single circuit and double circuit with symmetrical and unsymmetrical spacings. |
| C207.6 | Analyze the performance of short and medium transmission lines by using ABCD parameters for nominal pi and T circuits. |

| **Course Code: 203146** | |
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| **Name of Course: Electrical Machines-I** | |
| C208.1 | Compute performance parameters of the transformer by conducting open circuit and short circuit test and draw the approximate equivalence circuit diagram. |
| C208.2 | Distinguish between star-delta, delta-star, star-star, and delta-delta transformer connections as per phasor groups with applications and to perform parallel operation of single and three phase transformers. |
| C208.3 | Explain working principal, and construction of DC machines. |
| C208.4 | Analyze the performance parameters, characteristics of DC shunt motor by conducting brake test and speed control. |
| C208.5 | Draw the approximate equivalent circuit of induction motors, determine its parameters by conducting no load, and blocked rotor test. |
| C208.6 | Test and evaluate performance of induction motors as per IS standards. |

| **Course Code: 203147** | |
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| **Name of Course: Network Analysis** | |
| C209.1 | Calculate current/voltage in electrical circuits using simplification techniques, Mesh, Nodal, Analysis and network theorems. |
| C209.2 | Develop the problem solving technique for network by application of superposition, Thevenin's, Norton's, maximum power transfer, Millmann's theorem applied to both AC and DC circuits. |
| C209.3 | Analyze transient response of R-L, R-C, R-L-C network in the time domain approach. |
| C209.4 | Apply Laplace Transform to solve series and parallel R-L, R-C, R-L-C circuits by analyzing transient response for source free and source driven circuits. |
| C209.5 | Analyze two port networks to evaluate the parameters of electrical system. Apply the knowledge of network theory to find transfer function, poles and zeros location to perform system stability. |
| C209.6 | Classify the low pass, high pass, band pass and band stop filter. Design of constant K-low |

pass and constant K high pass filter for symmetrical network.

| Course Code: 203148 | |
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| **Name of Course: Numerical Methods and Computer Programming** | |
| C210.1 | Development of the algorithms and implement the programs using C language for numerical techniques. |
| C210.2 | Calculate numerical computation errors and roots of polynomial equations using Birge-Vieta method. |
| C210.3 | Solve transcendental and polynomial equation using bisection, secant, regula falsi, Chebyshev, and Newton Raphson's method and apply curve fitting techniques for graphical representation of known values of x and y tabulated data. |
| C210.4 | Apply interpolation techniques for finding unknown values x and y from known values of x from tabulated data. |
| C210.5 | Implement Taylor's series method, Euler's method, modified Euler's method, Runge – Kutta method for the solution of ODE and trapezoidal and Simpson's equation for solving numerical integration problems. |
| C210.6 | Solve simultaneous equations using Gauss elimination, Gauss Jordan, Gauss seidal and Gauss jacobi methods and Matrix inversion using Jordan method and Eigen values using power method. |

| Course Code: 203149 | |
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| **Name of Course: Fundamental of Microcontroller and Applications** | |
| C211.1 | Describe the architecture and features of 8051 microcontroller. |
| C211.2 | Illustrate addressing modes and instruction set of 8051 microcontroller. |
| C211.3 | Write programs in assembly language for microcontroller 8051. |
| C211.4 | Elaborate interrupt structure of 8051 and develop the program to handle interrupt and serial communication using RS232. |
| C211.5 | Understand the microcontroller development tools and interfacing, programming of PPI 8255, 8 bit ADC (0809), DAC (0808) with 8051 microcontroller. |
| C211.6 | Measure pressure, temperature, flow, level, voltage, current, power (kW), power factor, frequency and speed control of DC motors and stepper motor using 8051. |