## SYLLABUS FOR CANDIDATES HAVING B.E/B.TECH in ELECTRICAL / ELECTRONICS/ ELECTRONICS AND COMMUNICATION

**Electric Circuits & Electromagnetic Fields:** Network Elements, KCL, KVL, Mesh Analysis, Network Theorems, Transient and Steady state responses of dc and ac networks, Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

**Signals & Systems:** Continuous and discrete time signals, linear time invariant and causal systems, Fourier transform, Sampling theorem, Laplace transform and Z transform, Applications of Fourier, Laplace transform, and Z transform for continuous and discrete time signals.

**Electrical Machines:** Single phase transformers, Three-phase transformers: connections, vector groups, parallel operation; Auto-transformer, Electromechanical energy conversion principles; DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, speed control of dc motors; Three-phase induction machines: principle of operation, types, performance, torque-speed characteristics, no-load and blocked-rotor tests, equivalent circuit, starting and speed control; Operating principle of single-phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance and characteristics, regulation and parallel operation of generators, starting of synchronous motors; Types of losses and efficiency calculations of electric machines.

**Power Systems:** Basic concepts of electrical power generation, ac and dc transmission concepts, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential, directional and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

**Control Systems:** Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Stability analysis using Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, Solution of state equations of LTI systems.

**Analog and Digital Electronics:** Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis. Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: biasing, equivalent circuit and frequency response; oscillators and feedback amplifiers; operational amplifiers: characteristics and applications; combinatorial and sequential logic circuits, multiplexers, demultiplexers, Schmitt triggers, sample and hold circuits, A/D and D/A converters.

**Power Electronics:** Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost Converters; Single and three-phase configuration of uncontrolled rectifiers; Voltage and Current commutated Thyristor based converters; Bidirectional ac to dc voltage source converters; Single-phase and three-phase voltage and current source inverters, sinusoidal pulse width modulation.