

## Syllabus For Electrical Stream

Network graph ,KCL, KVL, node/ cut set, mesh/ tie set analysis, transient response of d.c. and a.c. networks -- sinusoidal steady-state analysis -- resonance in electrical circuits -- concepts of ideal voltage and current sources, network theorems, driving point, immittance and transfer functions of two port networks, elementary concepts of filters -- three phase circuits -- Fourier series and its application -- Gauss theorem, electric field intensity and potential due to point, line, plane and spherical charge distribution, dielectrics, capacitance calculations for simple configurations -- Ampere's and Biot-Savart's law, inductance calculations for simple configurations.

### Electrical Machines

Single phase transformer ,equivalent circuit, phasor diagram, tests, regulation and efficiency -- three phase transformers - connections, parallel operation -- auto transformer and three-winding transformer -- principles of energy conversion, windings of rotating machines: D. C. generators and motors - characteristics, starting and speed control, armature reaction and commutation -- three phase induction motors -- performance characteristics, starting and speed control -- single-phase induction motors -- synchronous generators performance, regulation, parallel operation -- synchronous motors - starting, characteristics, applications, synchronous condensers -- fractional horse power motors, permanent magnet and stepper motors.

### Power Systems

Electric power generation - thermal, hydro, nuclear -- transmission line parameters -- steady-state performance of overhead transmission lines and cables and surge propagation -- distribution systems, insulators, bundle conductors, corona and radio interference effects -- per-unit quantities -- bus admittance and impedance matrices -- load flow -- voltage control and power factor correction -- economic operation -- symmetrical components, analysis of symmetrical and unsymmetrical faults -- principles of over current, differential and distance protections -- concept of solid state relays and digital protection -- circuit breakers -- concept of system stability-swing curves and equal area criterion -- basic concepts of HVDC transmission.

### Control Systems

Principles of feedback -- transfer function -- block diagrams: steady-state errors -- stability-Routh and Nyquist criteria -- Bode plots -- compensation -- root loci -- elementary state variable formulation -- state transition matrix and response for LTI systems.

### Electrical and Electronic Measurements

Bridges and potentiometers, PMMC moving iron, dynamometer and induction type instruments -- measurement of voltage, current, power, energy and power factor -- instrument transformers -- digital

voltmeters and multimeters -- phase, time and frequency measurement -- Q-meter, oscilloscopes, potentiometric recorders, error analysis.

### Analog and Digital Electronics

Characteristics of diodes, BJT, FET, SCR -- amplifiers-biasing, equivalent circuit and frequency response -- oscillators and feedback amplifiers, operational amplifiers- characteristics and applications -- simple active filters -- VCOs and timers -- combinational and sequential logic circuits, multiplexes, Schmitt trigger, multivibrators, sample and hold circuits, A/D and D/A converters -- microprocessors and their applications. Power Electronics and Electric Drives