

SYLLABUS :-

Course Contents

Theory Component: Introduction:

Sources of energy; General structure of electrical power systems, Power transmission and distribution via overhead lines and underground cables, Steam, Hydel, Gas and Nuclear power generation.

DC Networks:

Kirchoff's laws, node voltage and mesh current methods, Delta-star and star-delta conversion, Superposition principle, Thevenin's and Norton's theorems.

Single phase AC Circuits:

Single phase EMF generation, average and effective values of sinusoids, solution of R,L,C series circuits, the j operator, complex representation of impedances, phasor diagram, power factor, power in complex notation, solution of parallel and series - parallel circuits.

Three phase AC Circuits:

Three phase EMF generation, delta and Y - connections, line and phase quantities, solution of three phase circuits, balanced supply voltage and balanced load, phasor diagram, measurement of power in three phase circuits, Three phase four wire circuits.

Magnetic Circuits:

Ampere's circuital law, B - H curve, solution of magnetic circuits, hysteresis and eddy current losses, relays, an application of magnetic force, basic principles of stepper motor.

Transformers:

Construction, EMF equation, ratings, phasor diagram on no load and full load, equivalent circuit, regulation and efficiency calculations, open and short circuit tests, auto-transformers.

Induction Motor:

The revolving magnetic field, principle of orientation, ratings, equivalent circuit, Torque-speed characteristics, starters for cage and wound rotor type induction motors.

DC Machines:

Construction, EMF and Torque equations, Characteristics of DC generators and motors, speed control of DC motors and DC motor starters.

Electrical Measuring Instruments:

DC PMMC instruments, shunt and multipliers, multimeters, Moving iron ammeters and voltmeters, dynamometer, wattmeter, AC watt-hour meter, extension of instrument ranges.

Laboratory Component: Suggested Experiments

- 1.To measure the armature and field resistance of a DC machine.
2. To calibrate a test (moving iron) ammeter and a (dynamometer) Wattmeter with

respect to standard (DC PMMC) ammeter and voltmeters.

3. Verification of circuit theorems - Thevenin's and superposition theorems (with DC sources only).
4. Measurement of current, voltage and power in R-L-C series circuit excited by single phase) AC supply.
5. Open circuit and short circuit tests on a single phase transformer.
6. Connection and starting of a three phase induction motor using direct on line (DOL) or star - delta starter.
7. Connection and measurement of power consumption of a fluorescent lamp and voltage - current characteristics of incandescent lamps.
8. Determination of open circuit characteristics (OCC) of a DC generator.
11. Two wattmeter method of measuring power in three phase circuit (resistive load only)