EE101 BASIC ELECTRICAL ENGINEERING (3-0-2: 4)

Analysis of DC circuits:
Mesh, node, branch, Ohm's law, series and parallel circuit, basic devices: resistors, capacitors, inductors, dependent and independent sources, Kirchhoff's Laws, Mesh and Node Analysis, Star-Delta conversion, Superposition theorem, Source conversion, Thevenin theorem, Norton theorem, Maximum power transfer theorem

Electromagnetic Induction & Magnetic Circuit:
Magnetic field, Right hand rule, Left hand rule, Electromechanical laws, relation between electricity and magnetism, production of emfs (ac & dc), Faraday's law of electromagnetic induction, direction of induced emf, Lenz law, dynamically and statically induced emfs, self inductances, and mutual inductances, coefficient of coupling, Inductance in series and parallel, energy stored in a magnetic field.

A.C Fundamentals and R.L.C circuits:
Phasors, Complex quantities, Application of complex algebra to A.C circuit, series and parallel RL, RC, RLC circuit, concept of impedance triangle, complex power: active, reactive and apparent power, power triangle, admittance triangle, series-parallel circuit.

Polyphase Networks:
Balanced two phase and three phase systems, Balanced Star-Delta connections, phase and line currents and voltages and their relations, Measurement of three phase power

D.C machines:
Generator construction, working principle, e.m.f equation, Commutation, different types of dc generator, dc motor principle, different types of motor, Voltage equation of motor, Losses and efficiency.

Transformer:
Principle of operation, construction, EMF equation, Ideal transformer & corresponding phasor diagrams, Approximate equivalent circuit of single phase transformer, Transformer on load with phasor diagrams, Losses in transformer, Determination of efficiency by s.c & o.c tests, Introduction to regulation.

Three phase induction motor:
Constructional view of IM, principle of operation , slip, types of three phase IM (Squirrel cage type & Slip Ring type), rotor frequency, equivalent circuit.

Measuring Instruments: MC, MI and DM type instruments, energy meter.

Suggested List Of Laboratory Experiments:

1. OC and SC Tests on single phase transformer
2. Sumpner's Test on single phase transformer
3. Parallel operation of single phase transformer
4. OCC test on DC shunt generator
5. Speed control of DC shunt motor
6. Brake test on DC shunt motor
7. Brake test on DC series motor
8. Swinburne's Test
9. Hopkinson's Test
10. Tests on compound DC machines

Text Books:

1. A. Hussain, Fundamental of Electrical Engineering, Dhanpat Rai & Co. Ltd.
2. V.N Mittle, Basic Electrical Engineering, Tata McGraw Hill.

References:

1. H. Cotton, Electrical Technology, Pitman Publication.
2. Hughes, Electrical Technology, Longman.
3. S.K Bhattacharya, Electrical Machines, Tata McGraw Hill, New Delhi.
4. John Bird, Electrical Circuit Theory and Technology, Routledge, Taylor & Francis Group
5. W.H. Hayt, J.E. Kemmerley, Engineering circuit analysis, Int. St. Ed. McGraw Hill.