EE 101: Basic Electrical Engineering (2-0-0: 2)

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

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

Elementary Overview of Electrical Machines: Principle, Construction and Types of different rotating electrical machines, transformers.

Text Books:

1. A. Hussain, Fundamental of Electrical Engineering, Dhanpat Rai & Co. Ltd., 3rd edition, 2007.
2. V.N Mittle, Basic Electrical Engineering, Tata McGraw Hill, 2nd edition 2017.

References:

1. H. Cotton, Electrical Technology, Pitman Publication, 7th edition 2005.
2. Hughes, Electrical Technology, Longman, 10th edition 2010.
3. S.K Bhattacharya, Electrical Machines, Tata McGraw Hill, New Delhi, 4th edition 2017.
4. John Bird, Electrical Circuit Theory and Technology, Routledge, Taylor & Francis Group, 4th edition 2010.
5. W.H. Hayt, J.E. Kemmerley, Engineering circuit analysis, Int. St. Ed. McGraw Hill, 8th edition 2013.