EEL 100-A   ELECTRICAL TECHNOLOGY

(Common for B.Tech, Integrated M.Tech, Dual Degree MBA)

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Section A
Unit-1 D.C. Network Laws and Theorems:
D.C Circuits and their types, Ohm's Law, Voltage divider rule, Current divider rule , open circuit & short circuit characteristics, source conversion, Important definition related to network analysis, Kirchhoff's current law and Kirchhoff's voltage law, sign convention, applications to simple circuits. Mesh analysis and Nodal analysis, Star to Delta & Delta to Star transformation. Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, Reciprocity Theorem, Tellegen's Theorem

Unit-2 Single Phase A.C. Circuits:
Sinusoidal signal, instantaneous and peak values, RMS and average values, crest and peak factor, Concept of phase, Phasor representation-polar & rectangular, exponential and trigonometric form, behaviors of R, L and C components in A.C. circuits, Series and Parallel A.C. circuits, Concept of active and reactive power, power factor and its importance. Series and Parallel resonance, Q factor, cut-off frequencies and bandwidth.

Unit-3 Three Phase A.C. Circuits:
Advantages of three phase circuits, Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method, Effects of wattmeter on wattmeter readings ,Earthing and its importance.

Section B

Unit-4 Transformers:
Definition, Need, Basic Principle, Construction, EMF equation, Ideal transformer, Phasor diagram on no load and full load, equivalent circuit, losses, regulation and efficiency, open and short circuit test.

Unit-5 Electrical Machines:
Construction, Principle, working, E.M.F. equation and losses of D.C. machine, Construction, principle, working of 3-phase induction motor and synchronous machine, comparison of 3-phase Induction motor and synchronous motor, Applications.

Unit-6 Measuring Instruments:
Introduction to Measuring Instruments, Various types of torques, Construction, operation and uses of moving iron type and moving coil type, Voltmeter, Ammeter, Watt meter, Energy meter.

EEP 100-A ELECTRICAL TECHNOLOGY LAB

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List of Experiments
1. To verify KCL and KVL.
2. To verify Thevenin's Theorem.
3. To verify Norton's Theorem.
4. To verify Maximum Power transfer theorem in D.C circuits.
5. To verify Superposition theorem.
6. To study frequency response of a series R-L-C circuit and determine resonant frequency and Q-factor for various values of R,L,C.
7. To study frequency response of a Parallel R-L-C circuit and determine resonant frequency and Q-factor for various values of R,L,C.
8. Measurement of power by 3 voltmeter / 3 Ammeter method.
9. Measurement of power in a 3-phase system by two wattmeter method.
10. To study various type of meters.
11. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
12. To perform O.C. and S.C. tests of a transformer.
13. To study the construction of DC Machines.
14. To perform direct load test of a D.C. shunt generator and plot load voltage Vs load current curve.

Note (Lab):-
1. At least 10 experiments are to be performed by students in the semester.
2. At least 7 experiments should be performed from the above list, remaining three experiments may either be performed from the above list or designed and set by the concerned institution as per the scope of the syllabus of EEL100 -A

Text Books:
1. Electrical Technology by Mukesh Saini; Vayu Publication, New Delhi
2. Electrical Technology (Vol-I) : B.L Theraja & A K Theraja, S.Chand

Reference Books:
1. Electrical Engineering Fundamentals : Deltoro, PHI
2. Network Analysis :Valkenburg, PHI
3. Electrical and Electronic Technology (8th edition): Hughes, Pearson.