Subject :Electrical Technology
Subject Code : ECE304

L	T	P	Full Marks 100 (80+20)
3		2	Hours - 42

Objectives:
This is a foundation course to understand the basic principles and behavior of electrical circuits, electrical power apparatus and utilization of electrical energy.

1. Electrical Engg Fundamentals (5 hrs)

Introduction to electrical circuits: Electric field, electric current, potential and potential difference, electric power, basic circuit components, ohm's law.
Sources and its types, Ideal and practical sources, Source Conversion, independent and dependent sources, Energy Stored in Inductor and Capacitor, series, parallel and series and parallel circuit.

2. DC Networks & Theorems: (05 hrs)

Laws and Theorems applicable to DC networks (KCL & KVL, Node voltage & Mesh current analysis, Star-Delta and Delta-Star conversion, Superposition principle, Thevenin & Norton theorem),Transients in R-L and R-C circuits with DC excitation, Simple problems.

3. AC Fundamentals (6 hrs)

Single-Phase AC Circuits: Single-phase EMF Generation, Average and Effective value of periodic ac signals, Peak factor & Form factor, Phasor and Complex representation of sinusoids, Power factor, complex power.
Three-Phase AC Circuits: Comparison between single-phase and three-phase systems, three phase EMF Generation, Line and Phase quantities in star and delta networks,

4. Magnetic circuits & Transformers (10 hrs)

Introduction to Magnetic Circuits: Introduction to Electromagnetism, B-H curve, Permeability, Reluctance, Solution of magnetic circuits, Hysteresis and Eddy current loss.
Single-Phase Transformers: Construction and principle of operation, EMF Equation, Transformation ratio, Practical and Ideal transformers, Transformer losses, Brief idea on Transformer Phasor diagram and transformer rating, Auto transformer. Introduction to 3 phase transformer

5. D C Machines (8 hrs)

D.C. Machines: Principle of operation, construction, classification of DC machines, EMF equation of DC generator, Speed Equation of DC Motor. Series , shunt and compound dc moters.

6. AC Machines **(4 hrs)**

Induction Motors: Introduction to Single-phase and Three-phase Induction Motors, Concept of Slip. Synchronous motors and special types of ac motors.

7. Power Systems: **(04 hrs)**

Introduction to generation, transmission and distribution of AC Power, basic idea on grounding, and safety, illumination

Text/reference books:

1. Rizzoni,Principles and Applications of Electrical Engineering., McGrawHill
2. Hughes, "Electrical & Electronic Technology", Ninth Edition Pearson Education.
3. V.D.Toro, "Basic Electrical Engineering", Prentice-Hall of India.
4. B.L.Theraja, A.K.Theraja, "A textbook of Electrical Technology" S.Chand. Ltd.
5. Rajendra Prasad, "Fundamentals of Electrical Engineering", PHI,
6. 6.D P khothari and I J Nagratha "Basic electrical engineering" 2nd ed, TMH.
7. N.N.ParkerSmith,"Problems in Electrical Engineering", CBS Publisher

Subject : Electrical Technology Laboratory
Subject Code :- ECE308

List of Experiments :

1. Connection and measurement of power consumption of various lamps.
2. Measurement of armature and field resistance of DC machine.
3. V-I Characteristics of incandescent lamps and time fusing current characteristics of a fuse.
4. Calculation of current, voltage and power in series R-L-C circuit excited by single phase AC supply and calculation of power factor.
5. Study of various parts of DC machine.
6. Study of single phase induction motor and fan motor.
7. Verification of superposition, Thevenin's and Norton's theorem.
8. Study of single phase energy meter.
9. Open circuit and short circuit test of single phase transformer.
10. Study of solar photo voltaic system.