BASICS OF ELECTRICAL ENGINEERING
EE-101

L: 2 T: 1 P: 0 Cr: 3

COURSE OUTCOMES:

1. To analyse circuit systems using direct application of Kirchoff current and voltage laws along with Ohms law
2. To understand basic concept of "*j*" operator, RLC series circuit, reactive power, true power and apparent power
3. To prepare the students to have basic knowledge of transformers, the equivalent circuit model of single phase transformers, transformer parameters using open circuit and short circuit tests, compute transformer efficiency and voltage regulation
4. Construction and understanding of working principles of DC generators and motors
5. The ability to select a suitable measuring instrument for a given application like PMMC and MI

SYLLABUS

UNIT-I :

Fundamentals of electric circuits, Kirchhoff's laws, mesh analysis, node analysis, delta-star and star-delta conversion, classification of network elements, Thevenin's theorem, Nortan's theorem maximum power transfer theorem, superposition theorem.

UNIT-II :

Single phase AC circuits, average and effective values of sinusoids, solution of R,L,C series circuits, the j operator, complex representation of impedances, phasor diagram, concept of power factor, power factor improvement, power in complex notation, solution of parallel and series-parallel circuits, resonance. Introduction to balance three phase AC circuits.

UNIT-III :

Ampere's circuital law, B-H curve, solution of magnetic circuits, hysteresis and eddy current losses. Relays as an application of magnetic force. Transformers- construction, e.m.f. equation, ratings, phasor diagram for no load and full load, equivalent circuit, regulation and efficiency calculations, open circuit and short circuit tests, Introduction to Auto-Transformer.

UNIT-IV :

Introduction to Electromechanical Energy Conversion, DC motors- construction, e.m.f. and torque equations, characteristics of DC generators and motors, speed control of DC motors. DC motor starter- working principle, ratings. Introduction to three phase induction motor, Introduction to alternator and synchronous motor and their applications.

UNIT-V :

PMMC instruments, shunts and multipliers, multi-meters, moving iron ammeters and voltmeters, dynamometer wattmeter, AC watt-hour meters, extension of instrument ranges.

Text Book:

1. D.C. Kulshrestha, "Basic Electrical Engineering", Tata McGraw Hill.
2. T.K. Nagsarkar&M.S.Sukhija, "Basic Electrical Engineering", Edition 2008, Oxford University Press.

Reference books:

1. V. Del Torro, Electrical Engineering Fundamentals, Second Edition, Prentice Hall of India Pvt. Ltd.
2. E. Hughes, Electrical Technology, English Language Book Society Publication with Longman.
3. H. Cotton, Advanced Electrical Technology, Issae Pitman, London.
4. S.S. Parker, Problems in Electrical Engineering, Asia Publications.
5. I. J. Nagarath, "Basic Electrical Engineering", 2nd Edition, Tata McGraw Hill.