Kerala Technological university KTU First year B.tech Syllabus for**BE101-03 INTRODUCTION TO ELECTRICAL ENGINEERING**

Course No. : BE101-03

Course Name: INTRODUCTION TO ELECTRICAL ENGINEERING
L-T-P-Credits: 2-1-0-3

Year of Introduction: 2015

Course Objectives:

The objective of this course is to set a firm and solid foundation in Electrical Engineering with strong analytical skills and conceptual understanding of basic laws and analysis methods in electrical and magnetic circuits.

Syllabus:

Fundamental Concepts of Circuit Elements and Circuit variables, Electromagnetic Induction, Real and Ideal independent voltage and current sources, V-I relations; Basic Circuit Laws, Analysis of resistive circuits, Magnetic Circuits; Alternating current fundamentals, Phasor Concepts, Complex representation, Phasor analysis of RL, RC, RLC circuit, admittances; Complex Power, Resonance in series and parallel circuits; Three-phase systems, analysis of balanced and unbalanced star and delta connected loads; Wiring systems, Earthing, Protective devices.
Expected outcome:

The course will enable students to learn advanced topics in Electrical Engineering.

Text Book:

1. Suresh Kumar K. S, Electric Circuits and Networks, Pearson Education.
2. S.K. Bhattachariya, Basic Electrical & Electronics Engineering, Pearson
3. Sudhakar and Syam Mohan, Circuits and Networks Analysis and Synthesis, Tata McGraw Hill

References:

1. Hughes, Electrical and Electronic Technology, Pearson Education
2. Joseph Edminister, Electric Circuits, Schaum's Outline Series, Tata McGraw Hill
3. John Bird, Electrical Circuit Theory and Technology, Routledge, Taylor & Francis Group
4. Parker and Smith, Problems in Electrical Engineering, CBS Publishers and Distributors
5. Hayt W. H., J. E. Kemmerly and S. M. Durbin Engineering Circuit Analysis, Tata McGraw Hill,

Module 1 Contents

Fundamental Concepts of Circuit Elements and Circuit variables: Electromotive force, potential and voltage. Resistors, Capacitors, Inductors-terminal V-I relations. Electromagnetic Induction – Faraday's laws, Lenz's law, statically and dynamically induced emf, self and mutual inductance, coupling coefficient. Real and Ideal independent voltage and current sources, V-I relations. Passive sign convention. Numerical problems.

Module 2 Contents

Basic Circuit Laws: Kirchhoff's current and voltage laws, analysis of resistive circuits - mesh, node analysis, super mesh and super node analysis. Star delta transformation. Magnetic Circuits: Magneto motive force, flux, reluctance, permeability- comparison of electric and magnetic circuits analysis of series and parallel magnetic circuits, magnetic circuits with air-gaps. Numerical problems.

Module 3 Contents

Alternating current fundamentals: Frequency, Period, RMS and average values, peak factor and form factor of periodic waveforms (pure sinusoidal and composite waveforms). Phasor Concepts, Complex representation (exponential, polar and rectangular forms) of sinusoidal voltages and currents, phasor diagrams, Complex impedance - series and parallel impedances and admittances. Phasor analysis of RL, RC, RLC circuits. Numerical problems.

Module 4 Contents

Complex Power: Concept of power factor - active, reactive power and apparent power. Resonance in series and parallel circuits: Energy, bandwidth and quality factor, variation of impedance and admittance in series and parallel resonant circuits. Numerical problems.

Module 5 Contents

Three-phase systems: Star and delta connections, three-phase three wire and three-phase four-wire systems, analysis of balanced and unbalanced star and delta connected loads, power in three-phase circuits. Numerical problems.

Module 6 Contents

Wiring systems: Basic concepts of wiring (conduit wiring only), service mains, meter board and distribution board.
Earthing: Earthing of installations - necessity of earthing, plate & pipe earthing.
Protective devices: protective fuses, MCB, ELCB.