Kerala Technological university KTU First year B.tech Syllabus for **EE100 Basics Of Electrical Engineering**

Course No. : EE100

Course Name: Basics Of Electrical Engineering
L-T-P-Credits: 2-1-0-3

Year of Introduction: 2015
Course Objectives:

To impart a basic knowledge in Electrical Engineering with an understanding of fundamental concepts.

Syllabus:

Elementary concepts of electric circuits, Kirchhoff's laws, constant voltage and current sources, Matrix representation; Magnetic circuits, energy stored in magnetic circuits, Electromagnetic induction, Alternating current fundamentals; AC circuits, Phasor representation of alternating quantities- rectangular, polar and exponential forms; Three phase systems, star and delta connection; Generation of power, Power transmission and distribution; Transformers, Electric Machines- D.C. Machines, AC Motors; Tariff, Wiring systems, Lamps.

Expected outcome:

The course will enable the students to gain preliminary knowledge in basic concepts of Electrical Engineering.

Text Book:

1. Sudhakar And Syam Mohan, Circuits And Networks Analysis And Synthesis, Tata Mcgraw Hill.
2. S.k. Bhattachariya, Basic Electrical & Electronics Engineering, Pearson.
3. V. K. Mehta, Rohit Mehta, Basic Electrical Engineering, S. Chand Publishing.

References:

1. Vincent Del Toro, Electrical Engineering Fundamentals, Prentice Hall Of India.
2. Hughes, Electrical And Electronic Technology, Pearson Education South Asia.
3. Parker And Smith, Problems In Electrical Engineering, Cbs Publishers And Distributers.
4. Hayt W. H., J. E. Kemmerly And S.m. Durbin Engineering Circuit Analysis, Tata Mcgraw Hill.
5. John Bird, Electrical Circuit Theory And Technology, Routledge, Taylor & Francis Group.

Module 1 Contents

Elementary concepts of electric circuits: Kirchhoff's laws, constant voltage and current sources, formation of network equations by node voltage and mesh current methods. Matrix representation - solution of network equations by matrix methods, star-delta conversion (Analysis of resistive networks only). Numerical problems.

Module 2 Contents

Magnetic circuits: MMF, field strength, flux density, reluctance, energy stored in magnetic circuits. Electromagnetic induction: Faraday's laws, Lenz's law-statically induced and dynamically Induced emfs- self-inductance and mutual inductance, coefficient of coupling. Alternating current fundamentals: Generation of alternating voltages, waveforms frequency, period, average and RMS values and form factor. Numerical problems.

Module 3 Contents

AC Circuits: Phasor representation of alternating quantities- rectangular, polar and exponential forms. Analysis of simple AC circuits - concept of impedance. Power and power factor in AC circuits- active, reactive and apparent power. Solution of RL, RC and RLC circuits. Three phase systems: Generation of three phase voltages- advantages of three phase systems, star and delta connection, three wire and four wire systems, relation between line and phase voltages, line and phase currents. Three phase power measurement by two wattmeter method. Numerical problems.

Module 4 Contents

Generation of power: Block schematic representation of generating stations- hydroelectric, thermal and nuclear power plants. Renewable energy sources. Power transmission and distribution: Typical electrical power transmission scheme, need for high voltage transmission, substation equipments, primary and secondary transmission and distribution systems.

Module 5 Contents

Transformers: construction of single phase and three phase transformers (core type only) – EMF equation, losses and efficiency. Electric Machines: D.C. Machines - Construction, types, principles of operation of dc motor, applications. AC Motors - Construction, principles of operation of single phase and three phase induction motor. Principle of operation of Universal motor.

Module 6 Contents

Tariff: Different types of LT and HT consumers, tariff schemes - uniform tariff and differential tariff. Wiring systems: Basic concepts of wiring (conduit wiring only), service mains, meter board and distribution board. Earthing of installations - necessity of earthing, plate & pipe earthing, protective fuses, MCB, ELCB. Lamps: Different types of lamps - Incandescent lamps, fluorescent, mercury vapour, sodium vapour, metal halide and LED lamps.