***EE101 Elements of Electrical Engineering***

**L-T-P-Cr: 3-1-0-4**

**Objectives:** The course is a foundation courses and first course for B. Tech students, where they are required to learn basics of DC and AC circuit analysis, different circuit laws and fundamentals of Electrical machines.

**Prerequisites:** Mathematics and Physics of 12th level.

**Outcome:** Ability to analyses DC and Ac Circuit, AC circuit phasor representation, Magnetic circuit for electrical machines, fundamentals of single phase Transformer and rotating machines

**Syllabus:**

Unit 1. Introduction: D.C. circuits steady state analysis with independent and dependent sources using Loop and node voltage method, Series and parallel circuits, star delta conversion, Superposition theorem, Thevenin’s theorem, Norton’s theorem, Maximum Power Transfer Theorem. **10** Lecture

Unit 2. A.C. circuits: Common signals and there waveform, RMS and Average value, form factor and peak factor of sinusoidal wave, Impedance of series and parallel circuits, Phasor diagram, Power, Power factor, Power Triangle, Resonance and Q-factor, Superposition, Thevenin’s and Norton’s Maximum Power transfer theorem for A.C. circuits. **10** Lecture

Unit 3. A.C. circuits 3-phase: Star delta, line and phase relation, Power relations, Analysis of balanced and unbalanced 3-phase circuits. **4** Lecture

Unit 4. Magnetic circuits: Introduction, Series & Parallel magnetic circuits, B-H Curve under A.C. excitation, Eddy current and hysteresis losses. **3** Lecture

Unit 5. Single Phase Transformer – Types, construction, operating principle, EMF equation, Turn ratio, Equivalent circuit, losses and efficiency. **5** Lecture

Unit 6. Introduction to DC Machine and three phase Induction Motor and starters for Induction Motor. 10 Lecture

**Suggested Readings:**

2. Fitzgerald, et.al, Basic Electrical Engineering, Tata McGraw Hill

3. Ashfaq Hussain, Fundamentals of Electrical Engineering, Dhanpat Rai & Co.

4. R. Prasad, Fundamentals of Electrical Engineering, PHI Publication