ESSENTIAL OF ELECTRICAL AND ELECTRONICS ENGINEERING

Course Objectives:

- To impart basic knowledge on fundamental laws of electric circuits to analyze simple ac circuits in steady state
- To understand the basic principle of operation and performance of Single Phase Transformers.
- ➤ To understand the basic principle of operation and performance of DC and AC Rotating Machines

Course Outcomes:

- 1. Apply fundamental laws of electric circuits and transformers to analyze simple ac circuits in steady state.
- 2. Identify the type of DC and AC rotating machines used for that particular application.
- 3. Demonstrate the operating principle and output characteristics of pn junction diodes, zener diode and op-amps.
- 4. Identify applications of pn junction diodes and zener diode in electronic circuits.
- 5. Realize the requirement of op-amps in electronic circuit applications

UNIT -I: Electric Circuits and Transformers

Ohm'slaw,Kirchhoff'slaws,electricelements(R,L,C),ACsupply,sinusoidal waveforms, Power Triangle, Transformer operating principle, construction, Emf equation, losses, efficiency, applications. Numerical problems (elementary level).

UNIT-II: DC Rotating Machines

DC generator operating principle, EMF equation, DC shunt generator characteristics (No-load & load), DC motor operating principle, torque equation, 3-pointstarter, speed control by flux and armature voltage control methods, numerical problems (elementary level).

UNIT-III: AC Rotating Machines

Phase Alternators operating principle, EMF equation, applications. 3-Phase Induction Motor operating principle, slip, torque equation, efficiency, applications, numerical problems (elementary level).

UNIT-IV: Semi conductor Devices

PN Junction diode, characteristics, applications-half wave and full wave rectifier. Zener diode, characteristics, application–regulator. BJT-operation, configurations, characteristics, applications - switch and amplifier.

UNIT-V: OP-AMPS

Block diagram of Op-Amp, equivalent circuit, Op-Amp AC and DC characteristics, inverting and non-inverting modes. Applications - adder, comparator, integrator and differentiator.

Text Books:

- 1. Basic Electrical Engineering, Ashfaq Hussain,, S. Chand Publication
- 2. Electrical Technology, Volume-2, AK Theraja, BLTheraja, S Chand Publications.
- 3. Electrical Machines P.S. Bhimbra, Khanna Publishers.
- 4. R.L.Boylestad and Louis Nashelsky, Electronics Devices and Circuits, PHI,11th edition, 2009.

Reference Books:

- 1. Electrical Machines by R.K.Rajput, Lakshmi publications,5th edition
- 2. Theory & Performance of Electrical Machines by J.B.Guptha. S.K.Kataria & Sons.
- 3. D.Roy Chowdhury, Linear Integrated Circuits, New Age International Pvt. Ltd., 4th edition, 2011.