

I Year II Semester

Code: 20ES2003

L T P C

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ESSENTIAL ELECTRICAL AND ELECTRONICS ENGINEERING

Course Objectives:

1. To impart basic knowledge on fundamental laws of electric circuits to analyse simple ac circuits in steady state
2. To understand the basic principle of operation and performance of Single Phase Transformers.
3. 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's law, Kirchhoff's laws, electric elements (R,L,C), AC supply, sinusoidal wave forms, 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-point starter, 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: Semiconductor 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, BL Theraja , 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.RoyChowdhury,Linear Integrated Circuits, New Age International Pvt. Ltd., 4th edition, 2011.