Basic Electrical Engineering

As per New JNTU* Hyderabad *Syllabus R 18

(Common to All branches for B.Tech First Year)

Basic Electrical Engineering

As per New JNTU* Hyderabad *Syllabus R 18
(Common to All branches for B.Tech First Year)

Authors

Mr. R. Durga Rao
Asst. Prof. & Head
Department of EEE
JNTUH College of Engineering Manthani
Ramagiri, Peddapalli -505 212, TS

Dr. D. Shobha Rani
Professor
Dept. EEE & Controller of Examinations
Institute of Aeronautical Engineering
Dundigal, Hyderabad – 500 043, TS

Dr. Ramalla Isaac
Professor
Department of EEE
Marri Laxman Reddy Institute of
Technology and Management
Dundigal, Hyderabad – 500 043, TS

Dr. A. Vinod
Associate Professor
Department of EEE
Marri Laxman Reddy Institute of
Technology and Management
Dundigal, Hyderabad – 500 043, TS

Seven Hills
INTERNATIONAL PUBLISHERS
standard series...

M/s SevenHills International Publishers, Hyderabad

A Part of StudentsHelpline Publishing House (P) Ltd. , Hyderabad

(An ISO 9001 : 2015 Certified Company)

Head Office

326/C, Level - 4, Surneni Nilayam
Near B K Guda Park, S R Nagar, Hyderabad - 500 038, INDIA
P.No:+91 40 23710657, 238000657 Fax: +91 40 23810657

Reg. Off

5-68, Pedda Gorpadu, Pakala, Tirupati, Chittoor - 517 112 AP, INDIA
mail:studentshelpline.in@gmail.com

First Edition-2019

` **325/- Student Edition**

` **525/- Library Edition with HB**

Printed at StudentsHelpline Group, S R Nagar, Hyderabad-38
Published by Surneni Mohan Naidu for SevenHills International Publishers, Hyderabad - 38

Basic Electrical Engineering

Course Objectives

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.

Course Outcomes

- To analyze and solve electrical circuits using network laws and theorems.
- To understand and analyze basic Electric and Magnetic circuits
- To study the working principles of Electrical Machines
- To introduce components of Low Voltage Electrical Installations

UNIT-I: D.C. Circuits

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.

UNIT-II: A.C. Circuits

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III: Transformers

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT-IV: Electrical Machines

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

UNIT-V: Electrical Installations

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Basic Electrical Engineering

Chapter-I: DC Circuits