

BASIC ELECTRICAL ENGINEERING

I B. TECH- I SEMESTER

Course Code	Category	Hours / Week			Credits	Maximum Marks		
A4EE01	ESC	L	T	P	C	CIE	SEE	Total
		3	1	-	4	30	70	100

COURSE OBJECTIVES:

The course should enable the students to:

1. To understand and analyze basic electric and magnetic circuits
2. To study the working principles of electrical machines
3. To introduce the components of low voltage electrical installations

COURSE OUTCOMES:

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

UNIT-I	DC CIRCUITS	CLASSES: 10
Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.		
UNIT-II	AC CIRCUITS	Classes: 10
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. Three-phase balanced circuits, voltage and current relations in star and delta connections.		
UNIT-III	TRANSFORMERS & ELECTRICAL INSTALLATIONS	CLASSES: 12
Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections. Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries		
UNIT-IV	DC MACHINES	Classes: 10
Principle and operation of DC Motor, Construction of DC machine. Types of DC motor, losses and Torque equation. DC generator construction, working principle and its EMF equation. Types of dc generators, efficiency of dc generator, problems on Emf equation. Applications.		
UNIT-V	AC MACHINES	Classes: 08
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. Construction, working of Single-phase induction motor. Construction and working of synchronous generators, Emf equation and problems.		
TEXT BOOKS:		

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
3. Basic Electrical Engineering by M.S. Naidu and S. Kamakshaiah TMH
4. Mehta V K, —Principles of Electrical EngineeringII, S. Chand & Company

REFERENCE BOOKS:

1. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
2. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
4. Nagsarkar T K and Sukhija M S, —Basics of Electrical EngineeringII, Oxford press. Basic concepts of Electrical Engineering, P.S. Subramanyam, BS Publications.