

## BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, IT, AI & MI, DS, CS and CSIT)

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
A5EE70	ESC	3	1	-	4	30	70	100

### COURSE OBJECTIVES:

1. Develop fundamentals, including Ohm's law, Kirchhoff's laws and be able to solve for currents, voltages and power in electrical circuits.
2. Develop EMF equation and analyze the operation of DC Machines.
3. Analyze the working principle of Transformer.
4. Discuss the operation of AC Machines.
5. Analyze the operation of PN junction diode and rectifiers.
6. Discuss the operation and characteristics of Transistors.

### COURSE OUTCOMES:

Upon successful completion of this course, student will be able to :

1. Analyze and solve for current values in resistive circuits with independent sources.
2. Analyze the working of DC machines and solve the numerical problems..
3. Analyze the working of AC electrical machines and solve the numerical problems.
4. Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
5. Analyze the different configurations of Transistors and obtain its characteristics.

### UNIT I : ELECTRICAL CIRCUITS

Classes : 12

Basic definitions-Ohm's Law, types of elements, types of sources , Kirchhoff's Laws – simple problems., series & parallel resistive networks with DC excitation, star to delta and delta to star transformations.

### UNIT II : DC MACHINES

Classes : 12

Principle of Operation of DC Motor, types of DC motor, Torque equation & Losses and problems. DC Generator construction and working Principle, EMF Equation types of generators and problems.

### UNIT III : AC MACHINES

Classes : 12

Working principle and Construction of transformer, Emf Equation & problems, Principle operation of 3-phase induction motor, slip and torque Equation, Torque –slip characteristics & problems, principle operation of 3-phase Alternator, Emf Equation of Alternator & problems.

#### **UNIT IV : DIODE AND ITS CHARACTERISTICS**

**Classes : 12**

PN JUNCTION DIODE: Operation of PN junction Diode: forward bias and reverse bias, Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics. Rectifiers, Half wave, Full wave and bridge Rectifiers –capacitor filters, inductor filters

#### **UNIT V : TRANSISTORS**

**Classes : 10**

Bipolar Junction Transistor - NPN & PNP Transistor, CB, CE, CC Configurations and Characteristics – Transistor Amplifier.

#### **Text Books:**

1. Basic Electrical Engineering by *M.S.Naidu and S.Kamakshaiah* TMH
2. Electronic Devices and circuits by *J.Millman, C.C.Halkias and Satyabrata Jit* 2ed.,

#### **Reference Books:**

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, “Basic Electrical, Electronics and Computer Engineering”, Tata McGraw Hill, Second Edition, (2006).
2. Nagsarkar T K and Sukhija M S, “Basics of Electrical Engineering”, Oxford press (2005).
3. Mehta V K, “Principles of Electronics”, S.Chand & Company Ltd, (1994).
4. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, (2002).