

## Course Content & Grade

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			Theory	Practical	
B.TECH. Common	Basic Electrical and Electronics Engineering	BT- 1004	Min.“D”	Min.“D”	5.0

**Unit- I : D.C. Circuits:** Voltage and current sources, dependent and independent sources, Units and dimensions, Source Conversion, Ohm's Law, Kirchhoff's Law, Superposition theorem, Thevenin's theorem and their application for analysis of series and parallel resistive circuits excited by independent voltage sources, Power & Energy in such circuits. Mesh & nodal analysis, Star Delta transformation & circuits.

### **Unit – II :**

**1- phase AC Circuits:** Generation of sinusoidal AC voltage, definition of average value, R.M.S. value, form factor and peak factor of AC quantity , Concept of phasor, Concept of Power factor, Concept of impedance and admittance, Active, reactive and apparent power, analysis of R-L, R-C, R-L-C series & parallel circuit

**3-phase AC Circuits:** Necessity and advantages of three phase systems, Meaning of Phase sequence, balanced and unbalanced supply and loads. Relationship between line and phase values for balanced star and delta connections. Power in balanced & unbalanced three-phase system and their measurements

**Unit – III : Magnetic Circuits:** Basic definitions, magnetization characteristics of Ferro magnetic materials, self inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, AC excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on a current carrying conductor. Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F.

**Single phase transformer-** General construction, working principle, e.m.f. equation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, open circuit and short circuit test

**Unit IV: Electrical Machines:** Construction, Classification & Working Principle of DC machine, induction machine and synchronous machine. Working principle & Emf equation of 3-Phase induction motor, Concept of slip in 3- Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor. Types of losses occurring in electrical machines. Applications of DC machine, induction machine and synchronous machine.

**Unit V : Basic Electronics:** Number systems & Their conversion used in digital electronics, Demorgan's theorem, Logic Gates, half and full adder circuits, R-S flip flop, J-K flip flop. Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT

**Course outcomes :** The final outcome of the subject will result into an enhancement in understanding the basic concepts of Core Electrical Engineering subjects. The topics covered under this subject will help to enhance the basic understanding of Electrical machines and power systems.

**Evaluation :** Evaluation will be continuous and integral part of the class followed by final examination.

### **References**

1. D.P. Kothari & I.J. Nagrath, Basic Electrical Engineering, Tata McGraw Hill, latest edition.
2. S.N. Singh , Basic Electrical Engineering, P.H.I.,2013
3. Rajendra Prasad, Fundamentals of Electrical Engineering, Prentice Hall,2014
4. M.S. Sukhija,TK Nagsarkar, Basic Electrical and electronics engineering, Oxford Uni. press, 2012
5. C.L. Wadhwa, Basic Electrical Engineering. New Age International.
6. B.L. Theraja & A.K Theraja Textbook of Electrical Technology - Vol. 1, S. Chand Publication
7. E. Hughes & I.M. Smith Hughes Electrical Technology Pearson
8. Vincent Del Toro Electrical Engineering Fundamentals