

Learning Outcomes:

Upon completion of this course, students will acquire knowledge about:

- Learn to predict the behavior of any electrical and magnetic circuits.
- Distinguish between DC, AC, single phase and three-phase AC supply systems, highlighting the advantages and disadvantages of the different systems.
- Apply basic electric laws in solving circuit problems and able to perform power calculation.
- Identify the types of capacitors and know the practical applications of various types of capacitors.
- Understand the basic concepts of Electromagnetic Induction and Electrical Generation principle.
- Understand the Economic Aspects of Electrical Engineering and apply this knowledge to work with better power factor leading to Energy Conservation.
- Develop the concept of Work, Power & Energy with Electrical Engineering perspective.
- Know the concept of Illumination from engineering point of view.

Syllabus:

Unit No.	Topics
1	D.C. Circuits : Source Transformation, Star-Delta Transformation, Application of Kirchhoff's Law, Superposition Theorem, Thevenin's Theorem, Norton's & Maximum Power Transfer Theorem.
2	Capacitor : Types of Capacitor, Capacitance of Multiple Parallel Plate Capacitor, Energy stored in a Capacitor, Charging & Discharging of Capacitor & Time constant.
3	Magnetic circuit : Law of Magnetic Circuit, Series & parallel Magnetic Circuits and Calculation, Comparison of magnetic & Electric Circuit, Magnetization Curves.
4	Electromagnetic Induction : Review of Faraday's Law, Lenz's Law, Self & Mutual Inductance, Inductance of coupled circuits, Rise and Decay of Current in Inductive circuit & Time Constant, Magnetic Hysteresis, Hysteresis Loss, Eddy Current Loss.
5	A.C.Circuits : Generation of A.C. Voltage , Equation of A.C. Voltage, Average value, R.M.S. Value, Form Factor, Peak Factor, Phase & Phase Difference, Vector Representation of A.C. Voltage and Current. Addition and Subtraction of Vectors, Mathematical Representation of Vectors, Complex Algebra, Polar & Exponential form, Pure Resistive, Pure Inductive, Pure Capacitive and combination of R-L-C Circuits, Active -Reactive and Apparent power & Power Factor, Resonance in R-L-C Series Circuit, Q-factor, Solution of Parallel circuit by Admittance, Phasor & Complex Algebra methods, Resonance in Parallel circuit.

6 3-Phase Circuits :

Generation of 3-phase voltage, Phase Sequence , Interconnection of three phase, Star – Delta, Voltage ,Current & Power relationship in balanced 3-Phase Circuits, Measurement of power in 3-phase circuit and Effect of power factor on Wattmeter readings.

7 Economic Aspects :

Tariff & its types, Causes and effects of low power factor, Methods of improving power factor.

8 Work, Power, Energy :

Heating Effect of Electric Current and Joule's law , Thermal Efficiency, Electrical Units of Power and Energy , Calculation of Power & Energy .

9 Illumination :

Definition and important terms, Laws of illumination, Requirement of good lighting, Types of lighting scheme, Street lighting, Factory and Flood lightning.

Text Books

1. U.A.Patel , “Elements of Electrical & Electronics Engineering “ ,Atul Prakashan.
2. B.L.Thereja,”Electrical Technology “, S.ChandVolume-I.

Reference Books

1. V.N.Mittal,”Basic Electrical Engineering”, Tata Mc Grawhill, New Delhi.
2. V.K.Mehta,”Principles of Power Systems “, Pub. By S.Chand.