

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,  
HYDERABAD**

**II Year B.Tech ECE II-Sem L T/P/D C**

**4 -/- 4**

**(A40215) PRINCIPLES OF ELECTRICAL ENGINEERING**

**Objectives:**

This course introduces the basic concepts of transient analysis of the circuits, the basic two-port network parameters and the design analysis of the filters and attenuators and their use in the circuit theory. The emphasis of this course is laid on the basic operation of DC machines and transformers which includes DC generators and motors, Single-Phase transformers.

**UNIT - I:**

**Transient Analysis (First and Second Order Circuits):** Transient response of RL, RC Series, RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method

**UNIT - II:**

**Two Port Networks:** Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one of Parameter to another, Conditions for Reciprocity and Symmetry, InterConnection of Two Port networks in series, Parallel and Cascaded configurations, Image Parameters, Illustration problems

**UNIT - III:**

**Filters and Symmetrical Attenuators:** Classification of Filters, Filter Network, Classification of Pass band and Stop Band, Characteristic Impedance in the Pass and Stop bands, Constant-k Low Pass Filter, High Pass Filter, m-derived T-Section, Band Pass Filter and Band Elimination filter, Illustrative problems, Symmetrical Attenuators - T-Type Attenuator, p-Type Attenuator, Bridged T-Type Attenuator, Lattice Attenuator

**UNIT - IV:**

**DC Machines:** Principle Of Operation Of DC Machines, EMF equation, Types of Generators, Magnetisation and Load Characteristics of DC Generators, DC Motors, Types of DC Motors, Characteristics of DC Motors, Losses and Efficiency, Swinburne's Test, Speed control of DC Shunt Motor, Flux and Armature Voltage control methods.

**UNIT - V:**

**Transformers and Their Performance:** Principle of Operation of Single Phase Transformer, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses and Efficiency of Transformer and Regulation, OC and SC test (Simple Problems), Synchros, Stepper Motors.

**TEXT BOOKS:**

1. Electrical Circuits - A. Chakrabarty, Dhanipat Rai & Sons.
2. Basic Concepts of Electrical Engineering - PS Sibranyam, BS Publications.

**REFERENCE BOOKS:**

1. Engineering Circuits Analysis - William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 7th Edition.
2. Basic Electrical Engineering - S.N. Singh PUI
3. Electrical Circuits - David A. Bell, Oxford Printing Press.
4. Electrical Circuit Analysis - K.S. Suresh Kumar, Pearson Education.

**OUTCOME:**

After going through this course the student gets a thorough knowledge on transient analysis of circuits, filters, attenuators, the operation of DC machines and transformers, with which he/she can be able to apply the above conceptual things to real-world problems and applications.