

ELECTRICAL TECHNOLOGY

II B-Tech – I Semester

L T P C

Course Code: A3EE51

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Course Overview:

This course deals with the study and application of electricity with the principles of electronics and electromagnetism. The course also emphasizes the basic principles of transients for first order and second order DC system using time-domain analysis and Laplace transform approach. This course describes the design of filters and various types of attenuators. This course exposes on importance of DC circuit analysis in electrical engineering and importance of AC circuit analysis. This course explains the operation of transformers and their parameters. This course is an exposition of the physical principles upon which the art of electrical engineering is based.

Course Objectives:

1. To analyze the transient response of circuits with dc excitation
2. To design the two port network parameters, filters and different types of attenuators
3. To explain about the performance of DC machines
4. To describe the operation of transformers.

Course Outcomes:

After going through this course the student will be able to

- Knowledge on basics of circuit concepts, electrical parameters
- explain single phase ac circuits
- Analyze magnetic circuits , resonance frequency
- Evaluate network topology
- Knowledge on network theorems with which he/she can able to apply the above conceptual things to real-world problems and applications

SYLLABUS

UNIT-I

Transient Analysis (First Order and Second Order Circuits): Transient response of RL, RC Series, RLC Circuits for DC excitation, Initial conditions, Solution using Differential Equation approach and Laplace Transform method

UNIT-II

Two Port Networks: Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity, and Symmetry, Interconnection of Two Port networks in Series, Parallel and Cascaded configurations, Image Parameters.. Illustrative problems.

UNIT-III

AC Machines: Working principle of operation and constructional details of 3-phase Induction motor-Slip-Torque characteristics-Losses-Applications. Working principle of operation and constructional

details of 3-phase Alternator-EMF equation-regulation of Alternator by synchronous impedance method.

UNIT-IV

D.C. Machines:- D.C Generators: Principle of operation of DC Machines, EMF equation, types of generators, magnetization and load characteristics of DC generators.

D.C. 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: 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 tests, (Simple problems). Synchronous, Stepper Motor, Working principle of Single Phase motors--types-applications.

TEXT BOOKS:

1. A.Sudhakar, Shyammohan S. Palli (2008), *Circuit and Networks*, Tata McGraw Hill, New Delhi, India.
2. B.L. Theraja, A. K. Theraja (2015), *A Text book of Electrical Technology (Volume-II)*, 4th edition, S.Chand, Publications, New Delhi, India.

REFERENCE BOOKS:

1. Joseph A. Edminister (2002), *Schaums outline of Electrical Circuits*, 4th edition, McGraw Hill Publications, India.
2. J. B. Gupta (2006), *Theory and Performance of Electrical Machines*, S. K. Kataria & Sons, New Delhi.