

Year & Sem: E1S1	Course Code: EE1101	Course Name: Electrical Technology	No. of Credits: 4	L 2	T&PS 2	P 0
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Unit-I: Basic Circuit Analysis concepts Circuit Concept, R-L-C Parameters & Elements, Voltage and Current Sources, Independent and Dependent Sources, Source Transformation, Kirchhoff's Laws, Network Reduction Techniques – Series, Parallel, Series Parallel, Star –to-Delta or Delta-to-Star Transformations, Nodal Analysis, Mesh Analysis, Super node and Super mesh for DC Excitations.

Unit-II: Single Phase and Three phase circuits A.C. Circuits R.M.S., Average values and form factor (for different periodic wave forms- Sinusoidal, Square, Ramp, Saw-tooth & Triangular), Steady State Analysis of R, L and C (in Series, Parallel and Series-Parallel Combinations) with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Phase and Phase difference, Concept of Power Factor, Real and Reactive powers, J-notation, Complex and Polar forms of representation, Complex power. Resonance-series, parallel circuits, concept of band width and Q factor. Phase Sequence- Star and Delta Connection-Relation Between Line and Phase Voltages and Currents in Balanced Systems- Analysis of Balanced Three Phase Circuits - Measurement of Active and Reactive Power in Balanced Three Phase Systems - Two Wattmeter Method of Measurement of Three Phase Power.

Unit-III: Magnetic circuits and Single phase Transformer Magnetic circuits -Faraday's laws of electromagnetic induction-concept of self and mutual inductance-dot convention-coefficient of coupling-composite magnetic circuit-analysis of series and parallel magnetic circuits. Principle of Operation of Single Phase Transformers –Types- EMF Equation - Operation on No Load and On Load -Phasor Diagrams. Equivalent Circuit, Losses and Efficiency, Regulation. OC and SC Tests - Predetermination of Efficiency and Regulation (Simple Problems)

Unit-IV: DC Machines Principle of Operation of DC Machines, EMF Equation, Types of Generators, DC Motors, Types of Motors, Losses and Efficiency, Swinburne's Test, Speed Control of DC Shunt Motor, Flux and Armature Voltage Control Methods.

Unit-V: AC machines Polyphase Induction Motors-Types- Production of a Rotating Magnetic Field - Principle of Operation. Special machines-fractional hp motors.

Unit-VI: Measuring Instruments

Principle and types of analog and digital volt meters, ammeters, wattmeter and energy meter.

References/Text Books:

1. Hughes, Electrical And Electronic Technology, Pearson 10/E 2011
2. DP Kothari and I.J Nagrath, Basic Electrical Engineering, McGraw-Hill Education (3rd edition) 2010.
3. WH Hayt JE Kemmerly and S M Durbin, Engineering circuit analysis, McGraw-Hill Book Company Inc, (8th Edition), 2013.
4. Vincent Del Toro's, Electrical Engineering Fundamentals, Pearson 2nd Edition, 2015.
5. JB Gupta, A course in Electrical Technology (Vol.2), S. K. Kataria& Sons, 2010.

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.

Video Lectures (Web Links):

1. <http://nptel.ac.in/courses/108108076/>
2. https://onlinecourses.nptel.ac.in/noc16_ee03
3. https://6002x.mitx.mit.edu/courseware/6.002_Spring_2012/

Study Materials (Web Links):

- 1.
- 2.

Problems & Solutions (Web Links):

- 1.
- 2.

Assignments (Web Links):

- 1.
- 2.