

ELECTRICAL CIRCUIT ANALYSIS

Course Code	19EE3301	Year	II	Semester	I
Course Category	Program Core	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisite	BEEE (19ES1101)
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Understand the concepts of single phase AC circuits, AC Power Analysis, resonance and circuit theorems.
CO2	Explain magnetic coupled circuits and different configurations of three phase circuits.
CO3	Apply circuit analysis concepts & theorems to solve electrical networks.
CO4	Analyze two port network parameters and three phase circuits.
CO5	Analyze the steady state behavior, time response of electrical networks.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: High, 2: Medium, 1: Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2										1	3	2
CO2	2	2										1	3	2
CO3	3	2										1	3	2
CO4	2	3										1	3	2
CO5	2	3										1	3	2

Syllabus

Unit No.	Contents	Mapped CO
I	Sinusoids, Phase, Phase difference, Phasors, phasor relationships for circuit elements. Complex and polar form representations, J-notation, Effective values of current and voltage. Instantaneous power, average power, Apparent power, real power, reactive power, power triangle, complex power, power factor. Steady state analysis of RL, RC and RLC circuits with simple examples.	CO1 CO5
II	Resonance: Series resonance, Parallel resonance, bandwidth, quality factor. Super Mesh and Super Node, Reciprocity theorem, Millman's theorem, Compensation theorem and Tellegen's theorem.	CO1 CO3
III	Transient Analysis: Time response of RL, RC, RLC series circuits for Zero input, Step input, sinusoidal excitation - Initial conditions-solution approach	CO5

	using differential equation and Laplace transforms.	
IV	Magnetically coupled circuits, Self Inductance, Mutual Inductance, Coupling coefficient, Dot convention. Two port networks - impedance parameters, admittance parameters, Hybrid parameters and Transmission parameters, relationships between parameters.	CO2 CO4
V	Three –phase circuits: Phase sequence, Relation between line and phase voltages and currents in balanced systems – Analysis of balanced three phase circuits – two wattmeter method for measurement of active & reactive power, measurement of three phase reactive power using one wattmeter method.	CO2 CO4
Learning Resources		
Text Books		
<ol style="list-style-type: none"> 1. Van Valkenburg M.E, ‘Network Analysis’, 3/e, Prentice Hall India . 2. William H. Hayt Jr., Jack E. Kemmerly, ‘Engineering Circuit Analysis’, 8/e, McGraw Hill. 3. Charles K.Alexander, Mathew N.O.Sadiku,"Fundamentals of Electric Circuits" (Fifth Edition), Tata McGraw-Hill. 		
Reference Books		
<ol style="list-style-type: none"> 1. Sudhakar and Shyammohan S Palli, Circuits and Networks: Analysis and Synthesis, Fifth Edition, McGraw-Hill Education. 2. Syed A.Nasar, 3000 solved problems in Electric Circuits, 1st Edition, Schaum's outline series McGraw-Hill Professional. 3. A.Chakrabarti, Circuit Theory – Analysis and Synthesis’, 7/e, Dhanpat Rai and Company. 		
e- Resources & other digital material		
<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/108/104/108104139/ 2. https://nptel.ac.in/courses/108/105/108105112/ 		