

COURSE CODE: 1151EE101	COURSE TITLE: CIRCUIT ANALYSIS	L	T	P	C
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COURSE CATEGORY: Program Core

PREAMBLE :

This course aims to develop the necessary fundamentals for Electrical and Electronics engineers to analyze and solve a simple circuit involving DC and AC by making use of network laws and theorems. This course also provides a basic and comprehensive knowledge of circuits involving three phase, resonance, coupled and transients which an electrical engineer will encounter in many applications and provide their solution. This course also helps an electrical and electronics engineer in solving complex networks by applying mathematical fundamentals of network topology.

PREREQUISITE COURSES: Basic Electrical Engineering

RELATED COURSES:

Electromagnetic Fields, Control Systems and fundamental to all courses of Electrical and Electronics Engineering.

COURSE EDUCATIONAL OBJECTIVES :

The objectives of the course are to make the students,

- Understand the significance of the basic terminologies in electrical circuits and relation between the electrical quantities of R, L and C.
- Proficient in handling basic laws and theorems in solving circuits.
- Familiar with network topology and two port networks.
- Comfortable in handling coupled and three phase circuits.
- Understand the effect of transients in time response and to analyze resonance.

COURSE OUTCOMES :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Apply the basic laws and theorems for a given circuit involving DC and AC	K2
CO2	Analyze the circuit using network theorems for DC and AC circuits	K3
CO3	Calculate the network graph and network parameters for a given circuit	K3
CO4	Analyze coupled and three phase circuits	K3
CO5	Analyze circuits involving transients and resonance	K3

CORRELATION OF COs AND POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	H	H	M	L				H		L	
CO2	H	H	H	M	L				H		L	
CO3	H	H	H	M	L				H		L	
CO4	H	H	H	M	L				H		L	

CO5	H	H	H	M	L				H		L	
COURSE CONTENT :												
UNIT I	BASIC CIRCUIT ANALYSIS											9
Review of circuit elements – types of electric circuits, types of voltage and current source, Kirchhoff's Laws, Mesh current and Node voltage analysis for DC and AC circuits, super mesh and super node												
UNIT II	NETWORK THEOREMS											9
Superposition theorem- Thevenin's theorem- Norton's theorem- Maximum power transfer theorem- Reciprocity theorem.												
UNIT III	NETWORK TOPOLOGY AND TWO PORT NETWORKS											9
Network topology, Incidence matrix, Tie-set matrix, Cut-set matrix, Dual networks- Two port network, Impedance Parameter, Admittance Parameter, Transmission line.												
UNIT IV	COUPLED AND THREE PHASE CIRCUITS											9
Self and Mutual inductance- Coefficient of coupling-Analysis of coupled circuits- Analysis of single tuned circuits, Solution of circuits with balanced and unbalanced loads- Power measurement by two wattmeter method.												
UNIT V	CIRCUIT TRANSIENTS AND RESONANCE											9
Transient response of RL, RC and RLC circuit using Laplace transform, Series and parallel resonance, quality factor for series and parallel resonance circuit, bandwidth and resonant filters.												
												TOTAL: 45 PERIODS
TEXTBOOKS:												
<ol style="list-style-type: none"> 1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", Tata McGraw Hill publishers, 6 th edition, New Delhi, 2003. 2. Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series, Tata McGraw-Hill, New Delhi, 2001. 												
REFERENCE BOOKS:												
<ol style="list-style-type: none"> 1. Paranjothi SR, "Electric Circuits Analysis," New Age International Ltd., New Delhi, 1996. 2. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, 2007. 3. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, 1999. 4. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2003. 												