

15EE103	ANALYSIS OF ELECTRIC CIRCUITS	L	T	P	C
	Total Contact Hours - 45	3	0	0	3
	Prerequisite				
	Nil				
PURPOSE					
To enrich the students about the basics of circuit analysis, network theorems, concepts of AC circuits, transient analysis and synthesis of electrical networks.					
INSTRUCTIONAL OBJECTIVES					
1.	Understand about the network elements, dependent sources, analysis of circuits using Mesh current & Nodal voltage method, network reduction, source transformation, and star –delta transformation.				
2.	Gain knowledge about the solution methods of AC circuits & series and parallel resonance				
3.	Gets an insight into solution of DC and AC circuits using network theorems				
4.	Get an insight into the transient analysis of RLC circuits with and without source.				
5.	Gain knowledge about 3-phase circuits, coupled and tuned circuits, network graphs.				

UNIT I – ANALYSIS OF DC CIRCUITS

(9 hours)

Introduction to DC circuits; Mesh analysis; Presence of dependent sources; circuits with current sources; Node analysis; presence of dependent sources, circuits with voltage sources; network reduction; source transformation; star-delta transformation.

UNIT II – ANALYSIS OF AC CIRCUITS

(9 hours)

Introduction to AC circuit; phasors; Impedance and admittance; steady state analysis of RL, RC and RLC circuits; power and power factor; Series and Parallel resonance; Mesh impedance matrix and node admittance matrix; solving AC circuits using mesh and node analysis.

UNIT III – NETWORK THEOREMS

(9 hours)

Super position theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Millman's theorem, Reciprocity theorem; Application of network theorems in solving DC and AC circuits.

UNIT IV – TRANSIENT ANALYSIS

(9 hours)

Introduction; Exponentially increasing and decreasing functions; time constant; RC and RL source free and driven circuits; transients in RC, RL and RLC circuit with DC excitation. Laplace transforms; Transform impedance; Circuit transients using Laplace transform.

UNIT V – THREE PHASE CIRCUITS, TUNED CIRCUITS AND GRAPH THEORY

(9 hours)

Analysis of balanced and simple unbalanced three phase circuits; Two-wattmeter method of measuring three-phase power; Analysis of coupled and tuned circuits; Graph of a network; Trees, chords and branches; Tie-set and cut-set of a graph.

TEXT BOOK

1. R. Jegatheesan, “*Analysis of Electric Circuits*”, McGraw Hill Education (India) Private Ltd, 2014.

REFERENCES

1. Charles K. Alexander and Matthew N. Q. Sadiku, “*Fundamentals of Electric Circuits*” Third Edition, Mc Graw-Hill International Edition, 2007.
2. Richard C. Dorf and James A. Svoboda, “*Introduction to Electric Circuits*”, 7th Edition, John Wiley & Sons, Inc. 2006.
3. William H Hayt, J E Kemmerly and Steven M Durbin, “*Engineering Circuit Analysis*”, Seventh Edition, Mc Graw Hill, 2007.
4. Sudhakar, A. and Shyam Mohan S.P, *Circuits and Networks Analysis and Synthesis*, Fourth edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2010
5. Edminister J.A., *Theory and Problems of Electric Circuits*, Schaum’s Outline Series, McGraw Hill Book Company, 5th Edition, 1995.

15EE103 - ANALYSIS OF ELECTRIC CIRCUITS												
Course designed by		Department of Electrical and Electronics Engineering										
1.	Student outcomes	a	b	c	d	e	f	g	h	i	j	k
		x				x						
2.	Mapping of instructional objectives with student outcome	1-5				1-5						
3.	Category	General (G)	Basic Sciences (B)		Engineering Sciences and Technical Arts (E)			Professional Subjects (P)				
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4.	Approval											