

COURSE CODE: 1152EE126	COURSE TITLE: <b>NETWORK ANALYSIS AND SYNTHESIS</b>	L	T	P	C
		3	0	0	3

**COURSE CATEGORY:**

Program Elective

**PREAMBLE :**

To expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple and multi-dimensional circuits including coupled circuits and three phase circuits.

**COURSE EDUCATIONAL OBJECTIVES:**

The objectives of the course are to make the students,

- To understand the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction.
- To analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.
- To understand the concept of active, reactive and apparent powers, power factor and resonance in series and parallel circuits.
- To solve the electrical network using mesh and nodal analysis by applying network theorems.
- To know the basic concepts of coupled circuits, three phase loads and power measurement.

**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)
C01	Understand the concept of graph theory using different analysis methods	K2
C02	Apply different network functions for the analysis of electrical networks	K3
C03	Understand the concept of two port networks	K2
C04	Understand the properties of network functions	K2
C05	Explain about the fundamental and types of filter	K2

**CORRELATION OF COs AND POs**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2	M	H						H		M	L	
CO3					H	M	M		M			
CO4		M	M			L		M		M	M	
CO5	M									H		

**COURSE CONTENT:**

<b>UNIT I</b>	<b>GRAPH THEORY :</b>	<b>9</b>
---------------	-----------------------	----------

Graph of a Network, definitions, tree, co tree, link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Nodal methods of analysis.

<b>UNIT II</b>	<b>NETWORK FUNCTIONS :</b>	<b>9</b>
Concept of Complex frequency , Transform Impedances Network functions of one port and two port networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot.		
<b>UNIT III</b>	<b>TWO PORT NETWORKS</b>	<b>9</b>
Characterization of LTI two port networks ZY, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T & $\Pi$ Representation.		
<b>UNIT IV</b>	<b>NETWORK SYNTHESIS</b>	<b>9</b>
Positive real function; definition and properties; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms.		
<b>UNIT V</b>	<b>FILTERS</b>	<b>9</b>
Image parameters and characteristics impedance, passive filter fundamentals, low pass, high pass, band pass ,band reject , (constant K type) filters,		
<b>TOTAL: 45 PERIODS</b>		
<b>TEXT BOOKS:</b>		
<ol style="list-style-type: none"> <li>1. M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India</li> <li>2. A.Chakrabarti, "Circuit Theory" Dhanpat Rai &amp; Co.</li> <li>3. C.L Wadhwa, "Network Analysis and Synthesis" New Age International Publishers, 2007.</li> <li>4. D.Roy Choudhary, "Networks and Systems" Wiley Eastern Ltd.</li> <li>5. Donald E. Scott: "An Introduction to Circuit analysis: A System Approach" McGraw Hill</li> </ol>		
<b>REFERENCE BOOKS:</b>		
<ol style="list-style-type: none"> <li>1. M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis",Wiley Eastern Ltd.</li> <li>2. N.C. Jagan and C. Lakshminarayana, "Newwork Analysis" B.S. Publications, 2008.</li> <li>3. K.S. Suresh Kumar, "Electric Circuits and Networks" Pearson Education, 2009.</li> <li>4. A Ramakalyan, "Linear Circuits: Analysis and Synthesis" Oxford University Press, 2005.</li> <li>5. Mahmood Nahvi, Joseph A Edminister "Schaum's Outline of Electric Circuits" TATA McGraw –Hill 2004</li> </ol>		