22EEPE11	NETWORK ANALYSIS AND SYNTHESIS		SEMESTER VI			
PREREQUISITE		CATEGORY	PE	Credit		3
Electric circuit Analysis		Hours/Week	L	T	P	TH
			3	0	0	3

Course Objectives:

1. To familiarize the different methods of analysis and synthesis of electrical circuits.

UNIT I	**S-DOMAIN ANALYSIS AND FREQUENCY DOMAIN ANALYSIS**	**9**	**0**	**0**	**9**

S - domain network – driving point and transfer impedances and their properties – transform network analysis– poles and zeros of network functions – time response from pole – zero plots. Immittance –loci of RLC networks – frequency response of RLC networks – frequency response from pole – zero – bode plots.

UNIT II	**NETWORK TOPOLOGY**	**9**	**0**	**0**	**9**

Network graphs, definitions, tree, co-tree,link, basic loop and basic cut sets – link currents; tie set schedules, tree branch voltages ; and cut – set schedules –incidence reduced incidence metrics – V shift and I shift – primitive impedance and admittance matrices – application to network solutions - duality and dual networks.

UNIT III	**TWO PORT NETWORKS**	**9**	**0**	**0**	**9**

Characterization of two port networks in terms of Z , Y,H and T parameters – networks equivalents – relations between network parameters –interconnections two port networks- T and π representation- Analysis of T, Ladder ,Bridged – T and lattice networks – transfer function of terminated two port networks.

UNIT IV	**ELEMENTS OF NETWORK SYNTHESIS**	**9**	**0**	**0**	**9**

Reliability of one port network – Hurwitz polynomials and properties – Positive Real functions and properties – frequency response of reactive one port – synthesis of one port network using Foster and Cauer methods - synthesis of RL, RC network using Foster and Cauer methods – synthesis of LC one port network.

UNIT V	**DESIGN OF FILTERS**	**9**	**0**	**0**	**9**

Classification of Filters – pass band and stop band filters; classification and characteristic impedance – design of constant – K, M – derived and composite filters – qualitative treatment of active filters – Butterworth and Chebyshev filters. Attenuators; T type, π type, lattice, bridged T and L type attenuators.

Total (45L+0T)= 45 Periods

Text Books:

1. Franklin F. Kuo, 'Network Analysis and Synthesis', Wiley India Private Limited, Second Edition, 2006
2. Sudhakar. A., and Shyammohan S Palli , 'Circuits and Networks: Analysis and Synthesis' McGraw Hill Education, New Delhi, Fifth edition, 2017.

Reference Books:

1. A.Chakrabarti, 'Circuit Theory-Analysis and Synthesis', Dhanpat Rai & Co., New Delhi, Seventh revised Edition, 2018.
2. Van Valkenburg, M.E., 'Network Analysis', Prentice Hall of India Private Ltd., New Delhi, Third Edition, 2014.

E- Reference:

1. https:// archieve.nptel.ac.in/courses/108/102/108102042/

Course Outcomes: Upon completion of this course, the students will be able to:			**Bloom's Taxonomy Mapped**
CO1	:	Describe time response and frequency response of electrical circuits	L2:Understanding
CO2	:	Apply graph theory to network solutions	L3:Applying
CO3	:	Characterize two port networks	L4:Analyzing
CO4	:	Choose appropriate method for network synthesis	L5:Evaluating
CO5	:	Design of filters and attenuator networks.	L6:Creating

COURSE ARTICULATION MATRIX															
COs/ POs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	3		2										2		
CO2	3		2		1								2	1	
CO3	3	3	2		1								3	1	
CO4	3	3	2	1		1							3	2	
CO5	3	3	2	3									3	2	
Avg	3	3	2	2	1	1	0	0	0	0	0	0	2.6	1.5	0
3/2/1-indicates strength of correlation (3- High, 2-Medium, 1- Low)															