Course code: Course Title	Course Structure			Pre-Requisite
EC104: Network Analysis & Synthesis	L	T	P	NIL
	3	1	0	

Course Objective: The objective of the course is to make the students proficient of analyzing any given electrical network and to learn how to synthesize an electrical network from a given immittance function.

S. NO	Course Outcomes (CO)
CO1	Describe basic concepts of circuit analysis.
CO2	Descibe various type of responses for different type of excitations for RC, RL and RLC circuits.
CO3	Apply of Laplace transform in circuit analysis.
CO4	Find two port network parameters and composite network parameters.
CO5	Synthesize one port passive network (LC, RC & RL).

S. NO	Contents	Contact Hours
UNIT 1	Basics of Network Theory: Star-Delta transformation, Introduction to Sinusoid and phasors, Phasor relationship for circuit elements Kirchoff's Voltage Law (KVL), Kirchoff's Current Law (KCL), Nodal Analysis, Mesh Analysis. Network Theorems for AC and DC Circuits: superposition, Thevenin and Norton's, maximum power transfer, Tellegen's theorem and its application	10
UNIT 2	Transient Analysis: Introduction to first order circuits, Natural and forced response analysis of RC and RL circuits, Introduction to second order circuits, Natural and forced response analysis of series and parallel RLC circuits, Transient analysis of general second order circuits.	8
UNIT 3	Circuit Analysis using Laplace Transform: Basics of Laplace Transform for circuit Analysis, Analysis of linear time invariant networks, s-domain representation of passive elements, transform methods in circuit analysis, Analysis of first order (RC, RL) and second order (series and parallel RLC) circuits using Laplace transform.	8
UNIT 4	Two-port network parameters: driving point and transfer functions, Impedance parameter, admittance parameter, Hybrid parameters, transmission parameter, Relationships between parameters, Analysis of interconnected networks using network parameters conversion.	8

UNIT 5	Elements of Realizability Theory: Causality and Stability, Concept of Hurwitz Polynomial, Positive real functions and its properties, Elementary synthesis procedure. Synthesis of one port networks with two kinds of elements: Synthesis of LC, RC, RL network function using Foster and Cauer forms. Introduction to passive filter: Realization of low pass filter, High pass filter, Band pass filter, Band Reject filter, All pass filter	8
	TOTAL	**42**

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Network Analysis; M. E. Van Valkenburg, Third Edition; Prentice Hall.	2019
2	Fundamentals of Network Analysis & Synthesis; B. Peikari; Jaico Publishing house.	2006
3	Network Analysis & Synthesis; F. F. Kuo; Wiley India edition, 2nd edition.	2006
4	Engineering Circuit analysis by Hyat Jr. & Kemmerly, McGraw Hill.	2013

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