Network Theory and Analysis

Course Code	19EC3301	Year	II	Semester	I
Course Category	Program Core	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	19ES1101 (Basic Electrical and Electronics Engineering)
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Estimate the steady state response of RC, RL and RLC circuits for sinusoidal excitation
CO2	Analyse various circuits in the time and transform domains using transient analysis methods
CO3	Analyse various networks by applying transformation techniques, mesh analysis, nodal analysis and network theorems
CO4	Evaluate the bandwidth and quality factor of series and parallel resonant circuits
CO5	Determine the characteristics of different two port networks

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2			1	1	1		1	2	1
CO2	3	3	2	2	2			1	1	1		1	2	1
CO3	3	3	2	2	2			1	1	1		1	2	1
CO4	3	3	2	2	2			1	1	1		1	2	1
CO5	3	3	2	2	2			1	1	1		1	2	1

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Sinusoidal Steady-State Analysis:** Sinusoids, sinusoidal functions and complex functions, instantaneous power, average power, effective values of current and voltage, apparent power and power factor, complex power, phasors, phasor relationships for R, L and C and steady state analysis of RL, RC and RLC circuits.	CO1
II	**Analysis of circuits**: Transient analysis of first order and second order systems, initial and final conditions in networks, dc transients: source free and forced response of RL, RC and RLC circuit analysis using Laplace transform.	CO2
III	**Network Theorems (Application to AC circuits):** Ohms law, Kirchoff's laws, series and parallel circuits, source transformations, delta-wye conversion, linearity and superposition theorem with simple examples, Thevenin's and Norton's theorem with simple examples, maximum power transfer theorem, mesh, super mesh analysis, nodal, super node analysis.	CO3

IV	**Resonance:**Series resonance, parallel resonance, bandwidth, selectivity, quality factor.	CO4
V	**Two Port Networks:**Impedance parameters, admittance parameters, hybrid parameters and transmission parameters, relationships between parameters.	CO5

Learning Resources
Text Books
1. M.E.VanValkenburg, Network Analysis, III Edition , Pearson Education 2. ASudhakar and ShyammohanSPalli, Circuits and Networks, 5th Edition, McGraw Hill
Reference Books
1.William H Hayt, Jack E Kimmerly and Steven M.Durbin, Engineering Circuit Analysis, Tata McGraw Hill 2.Ravish R Singh , Network Analysis and Synthesis, Tata McGraw Hill Education (India) Pvt.Ltd, New Delhi
e- Resources & other digital material
1.https://www.youtube.com/playlist?list=PLC7D3EAEFA0CC0420&app=desktop 2.https://www.tutorialspoint.com/network_theory/network_theory_quick_guide.htm 3.https://nptel.ac.in/courses/108/105/108105159/