

B.Tech II Year I Semester**NETWORK ANALYSIS****Course Code: 21EC304ES****L/T/P/C:3/0/0/3****Course Objectives:**

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states, transients states and s-domain in RLC circuits.
- To understand the two port network parameters.
- To study the network synthesis.

Course Outcomes: Upon successful completion of the course, students will be able to:

- Gain the knowledge on basic RLC circuit behavior.
- Analyze the Steady state, transient analysis and s-domain of RLC Circuits.
- Know the characteristics of two port network parameters.
- Analyze the network parameters used for the synthesis approach.

UNIT – I

Network Elements: Network Topology, Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

UNIT – II

Transient and Steady state analysis: Transient and Steady state analysis of RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. RC Circuits as integrator and differentiators. 2nd order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves.

UNIT – III

Circuit Analysis in s- domain: Concept of Complex frequency , Laplace transform and their application for circuit analysis, Network Functions-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

UNIT – IV

Two port Network: Two port network parameters, Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T, π L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network.

Unit – V

Network Synthesis: 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 Causer first and second form

Text/ Reference Books:

1. M.E. Van Valkenberg, "Network Analysis" Prentice Hall
2. D. Roy Choudhary, "Networks & Systems" New Age-Publication
3. W. H. Hayt & J. E. Kemmerly, "Engineering circuit Analysis", TMH
4. A Chakrabarti & S. Bhadra, "Networks & Systems" Dhanpat Rai & Co.
5. M.E. Van Valkenberg, "Network Synthesis" Prentice Hall