

EC305ES: NETWORK ANALYSIS

B.Tech. II Year I Sem.

L T P C
3 1 0 3

Pre-requisite: Basic Electrical & Electronics Engineering

Course Objectives: Objectives of this course are

- To understand the basic concepts on RLC circuits.
- To know the behavior of the steady states and transients states in RLC circuits.
- To know the basic Laplace transforms techniques in periodic waveforms.
- To understand the two port network parameters.
- To understand the properties of LC networks and filters.

Course Outcomes: After completion of this course student:

- Gains the knowledge on Basic network elements.
- Learns and analyze the RLC circuits' behavior in detail.
- Analyze the performance of periodic waveforms.
- Learns and gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g).
- To analyze the filter design concepts in real world applications.

UNIT - I

Review of R, L, C, RC, RL, RLC circuits, Network Topology, Terminology, Basic cutset and tie set matrices for planar networks, Illustrative Problems, 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

Steady state and transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 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

Network Analysis using Laplace transform techniques, step, impulse and exponential excitation, response due to periodic excitation, RMS and average value of periodic waveforms.

UNIT - IV

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.

UNIT - V

Standard T, π , L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network, T and π Conversion, LC Networks and Filters: Properties of LC Networks, Foster's Reactance theorem, design of constant K, LP, HP and BP Filters, Composite filter design.

TEXT BOOKS

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.

REFERENCES

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 5th Edition, 1993.
2. Electric Circuits – J. Edminister and M.Nahvi – Schaum's Outlines, MCGRAW HILL EDUCATION, 1999.
3. Network Theory – Sudarshan and Shyam Mohan, Mc Graw Hill Education.