III Semester B.E. (Electrical Engineering)
NETWORK ANALYSIS
Total Credit- 04
Subject Code:-BEEE3O2T

Teaching Scheme

Theory-03 Hours/Week

Tutorial/ Activity -01 Hours/Week

Practical:- 02 Hours/ Week

Examination Scheme

Th (U)= 70 Th(I)=30

Duration of University Exam:- 3 Hours

Course Objectives
Students will be able to –
  * To provide various methods of analysis of electric networks under transient and steady state conditions.
  * To provide concrete foundation needed to learn future professional courses.

Course Outcomes:
After studying the course, the students will be able to demonstrate the ability to
  CO1. Apply mesh current and node voltage methods to analyze electrical circuits.
  CO2. Apply network theorems for the analysis of networks.
  CO3. Obtain transient and steady-state responses of electrical circuits.
  CO4. Synthesize waveforms and apply Laplace transforms to analyze networks.
  CO5. Evaluate different Network Functions and understand two port network behavior

Unit –I: Sources, Mesh Analysis, Node voltage analysis   **(07 Hrs)**
Voltage and Current sources, source transformation, mesh basis equilibrium approach for simple networks of having mutual coupling, Node voltage analysis of networks, concept of duality.

Unit –II: Network Theorems   **(07 Hrs)**
Thevenin's, Norton's, Maximum Power transfer, Reciprocity theorems as applied to D C. & A. C. circuits with independent and dependent sources.

Unit –III: Solution of First and Second Order Networks   **(07 Hrs)**
Solution of first and second order differential equations of different combinations of series and parallel RLC networks. Initial and final conditions in network elements, free and forced response, time constants.

Unit –IV: Electric Circuit Analysis using Laplace Transforms   **(07 Hrs)**
Review of Laplace transform, waveform synthesis, Analysis of electrical circuits using Laplace transform for standard inputs, analysis of networks with and without initial conditions using Laplace transforms.

Unit –V: Two port networks and Network functions   **(08 Hrs)**

Two port networks, relationship between two port variables, driving point and transfer functions, properties, concept of complex frequency, Poles and zeros.

Two port network parameters: Impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnection of two port networks.

Text Books:

1. Van Valkenburg, "Network Analysis", Third Edition, 2009, Prentice Hall of India
2. Sudhakar, A, Shyammohan, "Circuits and Networks", Third Edition, 2006, Tata McGraw-Hill.
3. D. Roy Choudhary, "Networks and Systems", New Age International Publishers, 2nd Edition, 2012
4. Kelkar and Pandit, "Linear Network Theory", Pratibha Publications.

Reference Books:

1. Mahmood Nahvi, Joseph A Edminister, "Schaum's outline of Electric Circuits", 6th Edition, Tata McGraw-Hill, 6th Edition, 2013
2. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education, 2013.
3. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 2004.
4. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 1999.
5. K. Sureshkumar, "Electric Circuits & Network", Pearson Publication
6. Del Toro, "Electrical circuit", Prentice Hall