B.E. THIRD SEMESTER

Network Theory

Subject Code: BEETC-304T/BEEN-304T/BEEC-304T   Credits: 03
Teaching Scheme Lectures(including activity based learning): 3 Hours/ Week
Examination SchemeT(U) : 70 Marks , T (I) : 30 Marks
Duration of University Exam. : 03 Hours

Course Objectives:

The objective of this course is to provide students with understanding of

1. Various methods of analysis of electric networks under transient and steady state conditions.
2. Concrete foundation needed to learn future professional courses.

Course Outcomes:

Upon completion of this course, students will demonstrate the ability to:

1. Apply mesh and node voltage method to model and analyze electrical circuits.
2. Apply network theorems for the analysis of networks.
3. Obtain the transient and steady-state response of electrical circuits.
4. Synthesize waveforms and apply Laplace transforms to analyze networks.
5. Evaluate different Network Functions and Analyze two port network behavior

UNIT - I: Sources and Mesh Analysis (14 Marks):
Voltage, Current sources, source transformation and reduction, mesh basis equilibrium approach for complicated network containing independent sources and reactances.
Node Voltage Analysis (5 hours):
Nodal Basis equilibrium equation, matrix for electrical network containing independent sources and reactances. Duality.

UNIT- II: Network Theorems (14 Marks):
 Superposition, Thevenin's, Norton's, Maximum Power transfer, Reciprocity, Tellegen's theorem as applied to A. C. & D. C. circuits (problems with dependent sources are also to be dealt)

UNIT- III: Solution of First and Second order Networks (14 Marks):
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 (14 Marks):
 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 (14 Marks):
Two port networks, relationship between two port variables, driving point and transfer functions, properties, concept of complex frequency, Poles and zeros, evaluation of response from pole zero locations.
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. MahmoodNahvi, 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