Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in Applied Electronics and Instrumentation Engineering (AEIE)
(Applicable from the academic session 2018-2019)

Subject   : Network Analysis
Code   : PC-EI301
Contacts: 3L
Credit   : 3
Total lectures: 45

Course Content:

Module I
Introduction: Continuous & Discrete, Fixed & Time varying, Linear and Nonlinear, Lumped and Distributed, Passive and Active networks and systems. Independent & Dependent sources, Step, Ramp, Impulse, Sinusoidal, Square, Saw tooth signals. Network equations: Kirchoff's Voltage Law & Current Law, Formulation of network equations, Source transformation, Loop variable analysis, Node variable analysis.   **[8L]**

Module II
Network theorem: Superposition, Thevenin's, Norton's & Maximum power transfer theorem. Millman's theorem, Reciprocity theorem, Solution of Problems with DC & AC sources.

[8L]

Module III
Resonant Circuits: Analysis of R-C, R-L and R-L-C circuits under AC excitation using phasors. Series and Parallel Resonance, Impedance and Admittance Characteristics, Quality Factor, Half-Power Points, Bandwidth, Resonant voltage rise, Transform diagrams, Solution of Problems.

[8L]

Module IV
Laplace transforms: Transient analysis of R-C, R-L and R-L-C circuits with step excitation. Laplace transform and representation of periodic and periodic signals in Laplace domain. Application of Laplace transform for the analysis of R-C, R-L and R-L-C circuits with step, impulse and ramp input. AC and DC transient analysis of R-L, R-C & RLC circuits.

[7L]

Module V
Coupled circuits: Magnetic coupling, Polarity of coils, Polarity of induced voltage, Concept of Self and Mutual inductance, Coefficient of coupling, Modelling of coupled circuits, Solution of problems.

[4L]

Graph of Network: Concept of Tree, Branch, Tree link, junctions, Incident matrix, Tie-set matrix and loop currents, Cut-set matrix and node pair potentials, duality, solution of problems.   [5L]

Module VI
Two port networks analysis: Open circuit Impedance & Short circuit Admittance parameter, Transmission parameters, Hybrid parameters and their inter relations. Driving point impedance & Admittance.Solution of Problems with DC & AC sources.

[5L]

Textbook:
1. AChakrabarty," Circuit Theory Analysis & Synthesis", DhanpatRai
2. William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", Tata McGraw Hill publishers, 6th edition, New Delhi, (2002).

Reference book:
1. S P Ghosh, "Circuit Theory and Networks", Tata McGraw Hill.

2. Sudhakar A and Shyam Mohan SP, "Circuits and Networks- Analysis and Synthesis", McGraw Hill Education, (2015).
3.D.Chattopadhyay and P.C.Rakshit: "Fundamentals of Electrical Circuit Theory", S. Chand