PEL3I101 NETWORK THEORY

Module- I [11 Hours]

University Portion (80%)

Network Theorems: Superposition theorem, Thevenin's theorem, Norton's Theorem, Reciprocity Theorem, Maximum Power transfer theorem, Tellegen's theorem, Millman's theorem, Compensation theorem.Coupled Circuits: Coupled Circuits, Dot Convention for representing coupled circuits, Coefficient of coupling.

Resonance: Band Width and Q-factor for series and parallel resonant circuits.

College/Institute Portion (20%):

Electrical equivalent of magnetically Coupled Circuit, Tuned Couple Circuit: Single tuned and double tuned or related advanced topics as decided by the concerned faculty teaching the subject.

Module- II [9 Hours]

University Portion (80%)

Laplace Transform & its Application: Introduction to Laplace Transform, Laplace transform of some basic functions, Laplace transform of periodic functions, Inverse Laplace transform, Application of Laplace transform: Circuit Analysis (Steady State and Transient).

Two Port Network Functions& Responses: z, y, ABCD and h-parameters, Reciprocity and Symmetry, Interrelation of two-port parameters, Interconnection of two-port networks.

Network Functions: Significance of Poles and Zeros, Restriction on location of Poles and Zeros, Time domain behavior from Pole-Zero plots.

College/Institute Portion (20%):

Necessary conditions for transfer function, natural response of a network, Routh Hurwitz criterion of stability of network function or related advanced topics as decided by the concerned faculty teaching the subject.

Module- III [5 Hours]

University Portion (80%)

Fourier Series& its Application: Fourier series, Fourier analysis and evaluation of coefficients, Steady state response of network to periodic signals, Fourier transform and convergence, Fourier transform of some functions.

Passive Filter: Brief idea about network filters (Low pass, High pass, Band pass and Band elimination) and their frequency response

College/Institute Portion (20%):

Active filter-Butterworth, Chebyshev filter or related advanced topics as decided by the concerned faculty teaching the subject.

Module- IV [5 Hours]

University Portion (80%)

Network Synthesis: Realizability concept, Hurwitz property, positive realness, properties of positive real functions, Synthesis of R-L, R-C and L-C driving point functions in Foster and Cauer forms.

College/Institute Portion (20%):

Network Topology: Graph of a network, Concept of tree, Incidence matrix, Tie-set matrix, Cut-set matrix, Formulation and solution of network equilibrium equations on loop and node basis, Dual of a network or related advanced topics as decided by the concerned faculty teaching the subject.

Text Book:

1. *Fundamentals of Electric Circuits – Alexander & Sadiku – Tata McGraw Hil,5th Editionl.*
2. *Circuits & Networks: Analysis, Design and Synthesis- Sukhija & Nagsarkar- Oxford*

Reference Book(s):

1. *Network Analysis – M E Van Valkenburg – Pearson Education, 3rd Edition.*
2. *Network Synthesis – M E Van Valkenburg – Pearson Education.*
3. *Network Analysis and Synthesis – Franklin F. Kuo – Wiley Student Edition.*
4. *Linear Circuits Analysis and Synthesis – A Ramakalyan – Oxford University Press.*
5. *Problems & Solutions in Electric Circuit Analysis – Sivananda & Deepa – Jaico Book.*
6. *Theory and problem of electrical circuits, Schaum's Outline Series, TMH – Joseph A. Edminister, MahmoodMaqvi.*
7. *Electric Circuits – David A.Bell – Oxford, 7th Edition,2015.*