PBM3I102 **NETWORK THEORY**

Theory L/T (Hours per week): 3/0, Credit: 3

Module- I (10 Hrs) : **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.
Network Theorems & Coupled Circuits: Substitution theorem; Reciprocity theorem; Maximum power transfer theorem; Tellegen's theorem; Millman's theorem; Compensation theorem; Coupled Circuits; Dot Convention for representing coupled circuits; Coefficient of coupling.

Module- II (08 Hrs) : **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).

Module- III (08 Hrs) : **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 behaviour from Pole-Zero plots.

Module- IV (08 Hrs) : **Fourier Series and Fourier Transform**: 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; Brief idea about network filters (Low pass, High pass, Band pass and Band elimination) and their frequency response.

Additonal Module (Terminal Examination-Internal) (08 hours)

1. **Network Synthesis**: On network synthesis.

Text Book(s)

1. Network Analysis, M E Van Valkenburg, PHI, third edition.
2. Fundamentals of Electric Circuits, Charles K Alexander & Mathew N.O. Sadiku, Tata McGraw Hill, fifth edition.

Reference Book(s)

1. Network Theory, Smarajit Ghosh, PHI, first edition(2005)
2. Network Theory, P K Satpathy, P Kabisatpathy, S P Ghosh and A K Chakraborty Tata McGraw Hill, New Delhi.
3. Fundamentals of Network analysis and Synthesis, K.M.Soni, S.K.Kataria and Sons (2010) ninth edition
4. Network Analysis and Synthesis, Franklin F. Kuo ,Wiley Student Edition, second edition 2006