AMET-3: SIGNALS & NETWORKS

1. SIGNALS, SYSTEMS AND WAVEFORMS

Signals; Characteristics of Signals; Step,Ramp, and Impulse Functions (Signals); Systems (Types of Networks) -- Linear and NonLinear Network (Systems), Time Invariant and Time Variant Networks, Casual and Non Casual Networks, Passive and Active Networks, Lumped and Distributed Networks.

2. LAPLACE TRANSFORMS

Introduction, Definition of Laplace Transform, Properties of Laplace Transform, Inverse Laplace Transform, Inverse Laplace Transform Using Partial Fraction Expansion, Inverse Laplace Transform Using Convolution Integral.

3. APPLICATIONS OF LAPLACE TRANSFORMS

Introduction, Laplace Transformation For Solving Differential Equations, Application of Laplace Transform for Network Analysis, Definition of System Function, Impulse and Step Response of Networks.

4. NETWORK FUNCTIONS

Driving Point Functions, Transfer Functions, Poles and Zeros, Necessary Conditions.

5. TWO PORT NETWORKS

Introduction, Open Circuit Impedance Parameters or Z-Parameters, Short Circuit Admittance Parameters or Y Parameters, Hybrid Parameters, Transmission or ABCD Parameters, Interrelationships between the Parameters, Interconnection of Two Port Networks, Input Impedance In terms of Two Port Parameters, Output Impedance In terms of Two Port Parameters.

6. NETWORK TOPOLOGY

Graph of the Network; Graph Theory for Network Analysis ---Network Equilibrium Equations On Loop or KVL Basis, Network Equilibrium Equations On Node or KCL Basis; Network Equilibrium Equations in Matrix Form -- Mesh or Loop or KVL Equilibrium Equations, Node or KCL Equilibrium Equations.

7. DRIVING POINT SYNTHESIS

Synthesis of Networks with Two Kinds of Elements; LC – Driving Pont Immitance Functions -- Synthesis of L-C networks; RC Driving Point Immittance Functions --- Synthesis of RC functions; RL Driving Point Immittance Functions -- Note about RL and RC Networks; RLC Network Synthesis.