

Year & Sem: E1S2	Course Code: EC1204	Course Name: Network Theory	No. of Credits: 4	L 2	T&PS 2	P 0
Unit-I: Basic Concepts of networks: Basic definitions of voltage, current, power and energy , DC and AC concept, Network/Circuit Concept, Basic elements of circuits, Nodes, Branches and Closed path, Voltage and Current Sources, Ideal and Practical sources, Independent and Dependent Sources, Series and Parallel connections of sources and network elements, Source transformation, Ohm's and Kirchhoff's Laws, , Open circuit and Short circuit, Current and Voltage division rule, Network Reduction Techniques – Series, Parallel, Series Parallel, Star-to-Delta or Delta-to-Star Transformations, Nodal Analysis and Mesh Analysis. Unit-II: Network theorems and applications (with DC excitation): Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Application of theorems in analysis of networks. Unit-III: Single Phase A.C. Circuits: AC generation, Sinusoidal voltage and current sources, R.M.S., Average values and form factor (for different periodic wave forms- Sinusoidal, Square, Ramp, Saw-tooth & Triangular), Steady state response of R, L and C elements to sinusoidal excitations, Concept of Reactance, Impedance, Susceptance and Admittance, Phase and Phase difference, Concept of Power Factor, Real and Reactive powers, J- notation, Complex and Polar forms of representation , Complex power and Phasor representation, Resonance-RLC series, concept of band width and Q factor. Unit-IV: Network Topology Definitions, Graph, Tree, link and Cotree, Network variables, Incidence matrix, Basic cut-set and Basic Tie-set Matrices for Planar Networks, Formulation of Equilibrium equations, Duality & Dual Networks. Unit-V: Transient analysis of first order circuits: Natural and forced response , Source free RL and RC Circuits, Transient analysis of R, L and C circuits (series RL and RC) with DC Excitation. Analysis of Linear circuits using Laplace Transform: Introduction to Laplace transform, Circuit element models, Circuit Analysis using Laplace- examples, Transfer functions, Solution of circuit differential equations using Laplace transforms. Unit-VI: Two Port Networks: Relationship of two port variables, Open circuit Impedance parameters, Short circuit Admittance parameters, Transmission Parameters, Hybrid Parameters, Relationship between parameter sets, Reciprocity and Symmetry , Interconnection of two port networks. References/Text Books: 1. Valkenburg M.E Van, "Network Analysys" Prentice Hall 5 Edition 2. Engg Circuit Ananlysis hayt 7th Edition Tata MCgraw-Hill 3. Valkenburg M.E Van, "Network Analysys" Prentice Hall 5 Edition 4. Engg Circuit Ananlysis hayt 7th Edition Tata MCgraw-Hill 5. A Course on Electrical Technology by N.C. Jagan Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.						