

**APPLIED PAPER – II – THEORY OF GRAPHS**

**Unit I**

Definition of a graph – application of graphs – finite and infinite graphs – incidence and degree – isolated vertex pendant vertex and Null graph Isomorphic graphs – sub graphs – walks, paths and circuits – connected graphs – operations on graphs – more on Euler graphs – Hamiltonian paths and circuits (Chapter I & II)

**Unit II**

Trees - some properties of trees – pendent vertices in tree – distance and centers in a tree – rooted and binary trees – spanning trees – fundamental circuits – cut – sets – some properties of a cut – set – all cut – sets in a graph – fundamental circuits and cut –sets – connectivity and separability (Chapters III and IV)

**Unit III**

Planar graphs – Kuratowski's two graphs – different representations of graph – geometric dual – combinatorial dual – more on criteria of planarity Incidence matrix – sub matrices of  $A(G)$  –

**Unit IV**

Chromatic number – chromatic partitioning – chromatic polynomial – matching – coverings – the four colour problem five colour theorem – (Chapter VIII)

**Unit V**

Definition of a digraph – some types of digraphs – digraphs and binary relations – directed paths and connectedness – Euler digraphs – matrices A, B & C of digraphs – adjacency matrix of a digraph  
Treatment as in “Graph Theory with Applications to Engineering and Computer Sciences” by Narasingh Deo