VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
M.Sc. (I.T.) [Five Years Integrated Course]
B.Sc. (Information Technology)
2nd Semester Syllabus

Effective From July-2003

Paper No : 201
Paper Title : Maths – II.
Prerequisite : Matrix Theory & Discrete Mathematics.

[L : 4, P : 0 Hrs]

1. **Basic concept of Graph Theory:**
   Definition of (undirected) graphs: Basic Terminology; Types of undirected graphs; Weighted graphs; Multi graphs, Digraphs; Some applications of graph theory: NTLN's Graph isomorphism; Sub graphs; Walks, Paths and Circuits: Connected graphs and components; Operations on graphs; Fusion of vertices.

2. **Trees:**
   Definition of a tree; Some important properties; Cut vertices edges; Distance and center; Rooted and Binary trees; Spanning trees; Kruska's algorithm; Prim's algorithm; computer implementation; connectivity; Shortest path problems; (BFS and Dijkstra's Algorithm); separability.

3. **Euler and Hamiltonian Graphs:**
   Eulerian lines and Euler graphs; Euler's theorem on the existence of Eulerian paths and circuits; Hamiltonian paths and Hamiltonian graphs; The traveling salesman problem; TWO optimal algorithm; The colset insertion algorithm.

4. **Planar graphs:**
   Definition; Plane representation of a graph; Kuratowski's graphs; Euler's formula; Detection of planarity.

5. **Matrix representation of graphs:**
   Incidence matrix; path matrix; Adjacency matrix; Properties; Algorithm (WARSH ALL & MINIMA); Some types of digraphs; Digraphs and binary relation; relation matrix.

Main Readings:

1. N. Deo: Graph Theory with applications to engineering and computer science; Prentice – hall Inc. (1974).
2. K.R. Parthsarthy: Basic Graph theory; Tata McGraw Hill pub. Comp. Ltd; new Delhi (1994)
3. F. Harry: Graph Theory; Addison – Wesley Pub. Comp. (1972).
4. J.P. Trembly & R.P. Manohar: Discrete Mathematical structures with applications to Computer Science; McGraw Hill (1975).
5. B. Kolman; R.C Busby & S. Ross: Discrete Mathematical structures; Prentice Hall of India Pvt. New Delhi (2001).