Uttarakhand Technical University, Dehradun
New Scheme of Examination as per AICTE Flexible Curricula
Computer Science and Engineering, VI-Semester
Departmental Elective - CS604 (A) Graph Theory

Graph theoretic algorithms must be provided wherever required to solve the problems.

Unit- I

Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, trails, path & circuits, connected graphs, disconnected graphs and component, various operation on graphs, Euler graphs, Hamiltonian paths and circuits, the traveling salesman problem, directed graphs, some types of directed graphs, directed paths and connectedness, Hamiltonian and Euler digraphs.

Unit- II

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, trees with directed edges, fundamental circuits in digraph, algorithms of Prim, Kruskal and Dijkstra.

Unit -III

Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets, connectivity and separability, network flows, planer graphs, Euler's formula and its corollaries, Kuratowski's theorem and its application to planarity detection of graphs, combinatorial and geometric dual, some more criterion of planarity, thickness and crossings.

Unit -IV

Incidence matrix of graph, sub matrices of A(G), circuit matrix, cut set matrix, fundamental circuit matrix and rank of B, path matrix and relationships among , , &, adjacency matrices, adjacency matrix of a digraph, matrices A, B and C of digraphs, rank- nullity theorem, coloring and covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, enumeration, types of enumeration, counting of labeled and unlabeled trees.

References:

1. Deo, N: Graph theory, PHI

2. Bondy and Murthy: Graph theory and application. Addison Wesley.

3. John M. Aldous and Robin J. Wilson: Graphs and Applications-An Introductory Approach, Springer

4. Robin J, Wilson: Introduction to Graph Theory, Addison Wesley