

7th Sem

Graph Theory

Credits:4+2

UNIT-I: Graphs

Introduction of graphs, paths and cycles, Handshaking lemma, Weighted graphs, Bipartite graphs, Eulerian Graphs, Konigsberg bridge problem, Hamiltonian graphs, Paths and Circuits, Shortest Path Algorithms: Bellman Ford Algorithm and Dijkstra's Algorithm, Chinese Postman problem, Graph coloring.

UNIT-II: Trees

Trees and their properties, Types of trees (binary trees , n-ary trees), Degrees in trees, Spanning trees, Minimal spanning trees (Prim's algorithm, Kruskal's algorithm). Binary Search Trees, AVL trees, Red black trees.

UNIT-III: Planar Graphs and Matrix Representation of Graphs

Definition of planar graph, Euler's theorem for planar graph, Kuratowski's graphs, Incidence, Adjacency Matrices and their properties.

UNIT-IV: : Advanced Tree Structures & Algorithms

Inorder, Preorder, Postorder traversal in binary trees. Breadth First Search, Depth First Search. Binary Heaps (Min-heap and max-heap), heap property, Priority Queues, Concept of Tries, B Trees and B+ Trees, Huffman Coding Algorithm, Lowest Common Ancestor (LCA), Disjoint Set Union (DSU),

TEXT BOOKS:

1. Kolman, Busby & Ross, "Discrete Mathematical Structures". Prentice Hall 6th edition.
2. S. Santha, "Discrete Mathematics with Combinatorics and Graph theory".Cengage Learning.

REFERENCE BOOKS:

1. Kenneth H Rosen, "Discrete Mathematics and its applications with Combinatorics and Graph Theory", McGraw Hill
2. Graham, R. M., D. E., Knuth & O. Patashnik [1989], Concrete Mathematics, A Foundation for Computer Sciences, Addison Wesley