राष्ट्रीय प्रौद्योगिकी संस्थान अगरतला
National Institute of Technology, Agartala
Department of Computer Sc. & Engineering

Syllabus for Introduction to Graph Theory

UNIT I

Introduction: Graphs and their applications, graph theoretic terms: incidence, adjacency, degree, null graph, walk, trail, path, circuit, connected and disconnected graphs, various operations on graphs, isomorphism, Euler's graphs, Hamiltonian graphs, directed graph and its uses.

UNIT II

Trees and Fundamental circuits: Properties of trees, Jordan's Theorem, rooted trees, binary trees, counting trees, Cayley's theorem, spanning trees, matrix-tree theorem, and fundamental circuits.

UNIT III

Connectivity: Cut set & its properties, Vertex and edge connectivity, Menger's theorem, 1-Isomorphism and 2-isomorphism.

Planer graphs: Planer graphs and their representation, detection of planarity, Geometric dual, thickness and crossing.

UNIT IV

Matrix representation: Different matrix and their representation in directed and undirected graphs.

Coloring, matching and covering: Chromatic number, Chromatic partitioning, Chromatic polynomial, bipartite graph, matching and Hall's theorem, Covering, four-color and five-color theorem.

UNIT V

Graph Theoretic Algorithms: Prim's & Kruskal's algorithm, Dijkstra's algorithm, Bellman-Ford Algorithm, Floyd-Warshall algorithm, Ford-Fulkerson Algorithm.

Text Book:

1. Graph Theory with applications to Engineering and Computer Science; N. Deo., 3rd Edition, PHI Learning.
2. Introduction to Graph Theory: Douglas West, 2nd Edition, Pearson Publisher.

Reference Book:

1. Graph Theory with Applications: C. Vasudev, 1st Edition, New Age International Publisher.
2. Graph Theory: F. Harary, 3rd Edition, Addison-Wesley Publisher.
3. Algorithmic Graph Theory: Alan Gibbons, 6th Edition, Cambridge University Press.