University of Engineering and Management

Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur

Syllabus for B.Tech Admission Batch 2024

Subject Name: Graph Theory

Credit: 3

Lecture Hours: 36

Subject Code: PECCS602C

NPTEL

Module number	Topic	Sub-topics	Mapping with Industry and International Academia	Lecture Hours	Chapter Mapping
1	**Fundamental Concepts of graph theory**	Graphs, isomorphism, subgraphs, matrix representations, degree, operations on graphs, degree sequences, Walks, trails, paths, connected graphs, distance, cut vertices, cut edges, blocks, weighted graphs, connectivity, Dijkstra's shortest path algorithm, Floyd Warshall shortest path algorithm.	MIT OCW: https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/video_galleries/video-lectures/	10	*Introduction to Graph Theory: D.B. West (2001) Prentice Hall* *Chapter 1*

| 2 | **Trees** | Characterization of trees, rooted and binary trees, spanning trees and their properties, spanning trees in weighted graphs, minimum spanning tree, algorithms for minimum spanning tree. | MIT OCW: https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/video_galleries/video-lectures/ | 10 | *Introduction to Graph Theory: D.B. West (2001) Prentice Hall*

 Chapter 2 |

| 3 | **Coloring of Graphs** | Coloring: Basic equations, matchings in bipartite graphs, perfect; Vertex-colourings; Chromatic number and cliques, greedy coloring algorithm, coloring of chordal graphs, Brook's theorem; Edge colorings. | MIT OCW: https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/video_galleries/video-lectures/ | 10 | *Introduction to Graph Theory: D.B. West (2001) Prentice Hall*

 Chapter 5 |

| 4 | **Planar graphs, Directed graphs** | Basic concepts, Euler's formula for planar graphs, characterizations, planarity testing, 5-color-theorem; Directed graph, underlying graph, out-degree, indegree, connectivity, orientation, Eulerian directed graphs, Hamilton directed graphs, tournaments. | MIT OCW: https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/video_galleries/video-lectures/ | 6 | *Introduction to Graph Theory: D.B. West (2001) Prentice Hall*

Chapter 6 |

Textbooks: *1. Introduction to Graph Theory: D.B. West (2001) Prentice Hall.*
References:
1. Graph Theory: F.Harary (1969) Addison-Wesley.
2. Graph Theory: R. Diestel (2006) Springer .