MA410: Graph Theory (3-1-0:4)

Graphs, subgraphs, paths and cycles, isomorphism, cut vertex, bridge, block, bipartite graph, complement of a graph, line graph, degree sequence, graphic sequences, Havel-Hakimi theorem, trees, spanning trees, Cayley's theorem, metric in graph, matrix representation of graph.

Vertex and edge connectivity, Whiteney's theorem, n-connected graphs, Mengers' theorem.

Hamiltonian graphs, Euler graphs, planar graphs, homeomorphic graph, Kuratowski's theorem, dual graphs, crossing numbers, Euler formula, non planar graphs.

Introduction to matching, Berge's theorem, bipartite matching, Hall's Marriage theorem, Konig–Egervary theorem, graph coloring, chromatic partitioning, independent sets, dominating sets, the four color problem, graph covering.

Introduction to digraphs, connectedness-acyclic digraph, strong digraphs, tournaments, directed trees, binary trees, tree traversal-preorder, inorder, postorder, binary search trees, weighted trees and prefix codes, Huffman coding, BFS, DFS, Kruskal's, Prim's, Dijkstra's and Floyd's algorithms.

Introduction to matroids, matroids and graphs, matroids and traversals.

Text Books and References

1. D. B. West, "Introduction to Graph Theory", Pearson Education India; 2nd edition, 2015.
2. F. Harary, "Graph Theory", Narosa Publishing House, 2001.
3. R. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson, 4th edition, 1998.
4. C. R. Foulds, "Graph Theory Applications", Springer, 2nd edition, 1995.
5. B. Bollobas, "Modern Graph Theory", Springer Verlag, 2nd edition, 2002.