M.G. Science Institute (Autonomous) B.Sc. (Hons.) Mathematics

MAE 364 T: graph theory-1

Semester: VI	Course Title: graph theory-1	Credit: 2
Course No.: 364 T	MINOR (T)	Hours: 2/week

COs with cognitive Abilities:

COs	COGNITIVE ABILITIES	COURSE OUTCOMES
CO1	REMEMBERING	
CO2	UNDERSTANDING	
CO3	APPLYING	
CO4	ANALYSING	
CO5	EVALUATING	
CO6	CREATING	

Unit	Detailed Syllabus	No. of Hours of Teaching
I	Graph, Graphs as Models, More Definitions, Vertex Degrees, Subgraphs, Path and Cycles. The Matrix Representation of Graphs, Fusion, Definition and Simple Properties, Bridges.	15
II	Spanning Trees, Connector problems, Shortest path Problems, Cut vertices and Connectivity. Euler Tours, Hamiltonian Graphs	15

Suggested Reference Books:

1. A First Look at Graph Theory - John Clark and Derek Allan Holton, Allied Publishers Limited
2. Introduction to Graph Theory - R. J. Wilson, Longman.
3. Introduction to Graph Theory - Douglas B. West, Prentice-Hall of India, Second Edition, 2006, ISBN-81-203-2142-1.
4. Invitation to Graph Theory - S. Arumugam, S. Ramchandran, Scitech Publication (India) Pvt. Ltd, Chennai.
5. A First Course in Graph Theory - S. A. Choudum, Macmillan India Limited, SBN 033392 040 6.
6. Graph Theory – G. Suresh Singh, Prentice Hall of India

MAMDC 364 P: Mathematics Minor Practical

Semester: VI	Course Title:	Credit: 2
Course No.: 364 P	MINOR (P)	Hours: 4/week

COs with Cognitive Abilities

COs	COGNITIVE ABILITIES	COURSE OUTCOMES
CO1	REMEMBERING	Recall and define the basic properties of graphs; identify and compute order, size, degree, and completeness of given graphs.
CO2	UNDERSTANDING	Explain and construct incidence and adjacency matrices; interpret walks, paths, and cycles to understand the structure of graphs.
CO3	APPLYING	Apply Breadth First Search (BFS), Backtracking, and Dijkstra's Algorithm to determine the shortest paths between vertices in connected and weighted graphs.
CO4	ANALYSING	Analyze connectivity of graphs using adjacency matrices and the fusion algorithm; decompose graphs to identify components and relationships among vertices.
CO5	EVALUATING	Evaluate Euler circuits using Fleury's algorithm; assess the correctness and optimality of minimal spanning trees obtained through Prim's and Kruskal's algorithms.
CO6	CREATING	Design and implement algorithms to model and solve real-world problems using graph representations; construct efficient graph-based solutions for network and optimization problems.

CO-PO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3			
CO 2	3	3	3		
CO 3		3	3	3	
CO 4	3	3		3	
CO 5		3	3	3	3
CO 6			3	3	3

(Manual/Computer)

Sr. No.	Title of the Practical	No. of Hours of Teaching
1.	Check completeness of the graph.	5
2.	Find the incidence matrix of the graphs.	5
3.	Find the walks, path, cycle of the graphs.	5
4.	Find the degree, order and size of the graph.	5
5.	Find a shortest path between two vertices of a given connected graph using the Breadth First Search algorithm.	5
6.	Find a shortest path between two vertices of a given connected graph using the Back- tracking algorithm.	5

7.	Find a shortest path between two vertices of a given connected weighted graph using the Dijkstra's algorithm.	5
8.	Construct an Euler tour in a Euler graph using Fleury's algorithm.	5
9.	Find a minimal spanning tree of a given connected weighted graph using Prim's algorithm.	5
10.	Find a minimal spanning tree of a given connected weighted graph using Kruskal's algorithm.	5
11.	Using the adjacency matrix, determine whether the given graph is connected or not.	5
12.	Determine whether the given graph is connected or not using fusion algorithm.	5