Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim - Goa

Name of Faculty: Rohit R. Redkar	**Subject: Graphs and Networks**	
Paper code: MAT-604	**Program: MSc**	**Division:**
Academic year: 2024 - 2025	**Semester: III**	**Total Lectures: 52**

Course Objectives:
This course will develop fundamental concepts in graph theory, basic definition of simple graphs, types of graph, matrix representation of graphs, isomorphism in graphs, Euler & Hamiltonian graphs, trees & their properties, spanning trees, colouring of graphs, independence number and chromatic number of simple graphs, connectivity, cut-set, directed graphs, shortest paths & maximal flows in a network.

Expected Course Outcome:
1. Learner should be able to tell relevance of graphs in different context, ranging from puzzles & games to social science/engineering/computer science.
2. Problem solving & learning algorithms is also an essential part of graph theory.

Student Learning Outcome: On completion of the course the student will have:

1. Learnt the relevance of graphs in different context, ranging from puzzles & games to social science/engineering/computer science.
2. Learnt problem solving and algorithms in graph theory.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
July	02/07/2024	06/07/2024	4	Graphs, subgraphs, , matrices and isomorphism,bipartite graphs, regular graphs,Petersen graph	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
July	08/07/2024	13/07/2024	4	Operations on graphs, degree sequences, graphic sequences, complement of graph	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
July	15/07/2024	20/07/2024	4	distance in graphs, walks, trails, paths, circuits, cycles,Center, periphery, eccentricity of graphs	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
July	22/07/2024	27/07/2024	4	distance in graphs, Cut-vertices, bridges,non-separable graphs,blocks, classes of graphs, properties of trees	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
July-August	29/07/2024	03/08/2024	4	Minimal spanning trees, Prim's algorithm, Kruskal's algorithm, Prüfer sequence.	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs

August	05/08/2024	10/08/2024	4	Connectivity and edge-connectivity and results	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
August	19/08/2024	24/08/2024	4	Eulerian graphs, Fleury's algorithm and Hierholzer's algorithm	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
August	26/08/2024	31/08/2024	4	Hamiltonian graphs and results, digraphs, networks and terminologies	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
September	02/09/2024	05/09/2024	4	Results under networks, Ford Fulkerson algorithm, Dijkstra's algorithm to find the shortest route	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
September	16/09/2024	21/09/2024	4	Planar graphs and results, Euler's formula, characterizations of planar graphs, crossing number and thickness	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
September	23/09/2024	28/09/2024	4	Vertex colorings, examples and results, chromatic number	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs

September-October	30/09/2024	05/10/2024	4	Edge colorings, examples and results, map colorings, Five Color Theorem	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs
October	07/10/2024	12/10/2024	4	Matchings and independence in graphs, vertex cover, edge cover	Exercise	Smartboard, chalboard	G. Chartrand, L. Lesniak, Graphs and Digraphs

* Assessment Rubrics

Component	Max Marks
ISA 1	20
ISA 2	20
ISA 3	20
Practical	-
Project	-
Semester End Exam	40