Lecture Plan

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

Name of Faculty: Vishal Vinayak Gawas	**Subject:** Mathematics	
Paper code: MAT-223 Graph Theory Practical	**Program:** B.Sc.	**Division: -**
Academic year: 2025-26	**Semester: III**	**Total Lectures:** 30

Course Objectives:
To introduce Graph theory and motivate its study via useful computational algorithms.

Expected Course Outcome:

1) Display familiarity and knowledge of the concepts in the syllabus.
2) Demonstrate proofs to establish truths related to the concepts in the syllabus.
3) Choose the appropriate procedures and modify them, if needed, to solve method-based problems on the concepts in the syllabus.
   Analyze and solve unseen problems in Graph Theory and invent mathematically precise arguments to justify their solutions.

Student Learning Outcome: Student will be able to

1) Analyze structural properties of graphs.
2) Apply tree-based concepts and algorithms.
3) Solve colouring problems in graphs.
4) Understand planar graphs and their applications.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December	01/12/2025	06/12/2025	St. Francis Xaviers Feast 02	Bellman_Ford/ Floyd-Warshal Algorithm		Board and Chalk	Douglas B. West , Graph Theory
	08/12/2025	13/12/2025	02	Counting the number of walks of a given length between a pair of vertices using powers of the adjacency matrix (with proof).		Board and Chalk	Douglas B. West , Graph Theory
	15/12/2025	20/12/2025	Liberation Day 02	Dijkstra's algorithm to find the shortest paths between vertices in a weighted graph.		Board and Chalk	Douglas B. West , Graph Theory
	22/12/2025	23/12/2025	02			Board and Chalk	Douglas B. West , Graph Theory
January	02/01/2026	03/01/2026	02	Finding Eulerian Circuit using Hierholzer's Algorithm		Board and Chalk	Douglas B. West , Graph Theory
	05/01/2026	10/01/2026	02	Finding Eulerian path or Circuit using Fleury's Algorithm.		Board and Chalk	Douglas B. West , Graph Theory
	12/01/2026	17/01/2026	02	Havel's and Hakimi's algorithm to check if a given finite sequence of integers is a degree sequence of a graph.		Board and Chalk	Douglas B. West , Graph Theory
	19/01/2026	24/01/2026	02	Havel's and Hakimi's algorithm to check if a given finite sequence of integers is		Board and	Douglas B. West , Graph Theory

				a degree sequence of a graph.		Chalk	
	26/01/2026	31/01/2026	02 Republic Holiday	Huffman Algorithm to find Optimum Binary Tree (Huffman Tree) and derive the optimum binary prefix code for a given set of weights. Application to Huffman compression.		Board and Chalk	Douglas B. West , Graph Theory
February	02/02/2026	07/02/2026	02	Kruskal's algorithm to find the minimum weighted spanning tree in a connected weighted graph.		Board and Chalk	Douglas B. West , Graph Theory
	09/02/2026	14/02/2026	02	Prim's algorithm to find the minimum weighted spanning tree in a connected weighted graph.		Board and Chalk	Douglas B. West , Graph Theory
	16/02/2026	21/02/2026	02	Obtain Prufer Sequence for a given labeled tree and viceversa.		Board and Chalk	Douglas B. West , Graph Theory
	23/02/2026	28/02/2026	02	Showing that 2 given graphs are isomorphic/nonisomorphic.		Board and Chalk	Douglas B. West , Graph Theory
March	02/03/2026	07/03/2026	02 Holi	Trajan's Algorithm to find bridges in an undirected graph		Board and Chalk	Douglas B. West , Graph Theory
	09/03/2026	14/03/2026	02	Welsh and Powell Algorithm to obtain a vertex coloring of a graph.		Board and Chalk	Douglas B. West , Graph Theory
	16/03/2026	21/03/2026	02 Gudi Padva / Id-Ul Fitr	Welsh and Powell Algorithm to obtain a vertex coloring of a graph.		Board and Chalk	Douglas B. West , Graph Theory

	23/03/2026	28/03/2026	02 Ram Navami	Revision		Board and Chalk	Douglas B. West , Graph Theory
	30/03/2026	31/03/2026	02	Exam		Board and Chalk	Douglas B. West , Graph Theory

*** Assessment Rubrics**

Component	Max Marks
ISA 1	
ISA 2	
Practical	Nil
Project	Nil
Semester End Exam	25