



(Master of Science) (Mathematics)
(M. Sc.) (Mathematics) Semester (II)

Course Code	PS02EMTH51	Title of the Course	GRAPH THEORY-I
This course is same as PS01EMTH51 and can be offered to the students who have not taken the course PS01EMTH51.			
Total Credits of the Course	04	Hours per Week	04 (Four)

Course Objectives:	<ol style="list-style-type: none">1. Students will learn basic concepts as Chromatic number, matching, vertex and edge cover in this course. Also, the topic 'Directed Graphs' is introduced with basic properties, which is useful to study applications.2. Students will be aware of some well-known problems (e.g. Four color problem) which can be framed using graph parameters.
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Course Content		
Unit	Description	Weightage* (%)
1.	Review of basic facts about graphs: connected graph, tree, distance and diameter, Euler graph, isomorphic graphs. Chromatic number, chromatic partitioning, uniquely colorable graphs, chromatic polynomial, Four-color Problem.	25
2.	Matching and covers: maximum matching, Hall's matching condition, min-max theorems, independence number, vertex cover, edge cover, dominating set.	25
3.	Cuts and Connectivity: Vertex connectivity and edge connectivity. Hamiltonian cycles: necessary conditions, sufficient conditions. Directed Graphs: Definitions and examples, some special types of digraphs, directed path and connectedness, trees with directed edges, spanning out-tree, spanning in-tree.	25
4.	Directed graphs (conti.): Euler digraph and its application, relation of spanning out-tree and spanning in-tree with Euler digraph, Incidence matrix A, Circuit matrix B and Adjacency matrix X of digraphs, Fundamental circuits and fundamental circuit matrix in digraphs.	25

Teaching-Learning Methodology	Class room teaching
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Evaluation Pattern		
Sr.No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	solve problems.
2.	generalize certain graphs.
3.	students are curious to know its applications.

Suggested References:	
Sr.No.	References
1.	Narsingh Deo: Graph Theory with applications to Engg. & Computer Science, Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
2.	Douglas B. West: Introduction to Graph Theory, Pearson Education, Inc., 2002
3.	John Clark and D.A. Holton: A first look at graph theory, Allied Publishing Ltd., 1991.
4.	Robin J. Wilson: Introduction to graph theory, Addison Wesley longman limited, 1996

On-line resources to be used if available as reference material
On-line Resources

