

GRAPH THEORY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
I	21CPMA1E	Elective	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	3
			6	90	6	90		

COURSE OBJECTIVES:

The students will be able to

- Graph Theory is an integral part of Discrete Mathematics and has applications in diversified areas such as Electrical Engineering, Computer science, Linguistics.
- In this course basic concepts of Graph theory such as Trees, Eulerian Graphs, Matching, Vertex colorings, Edge colorings, Planarity, are introduced.

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Acquire the basic knowledge of graphs namely cut vertex , bridge, blocks of graph.	K2
CO2	Determine the properties of trees and connectivity	K3
CO3	Justify Eulerian graphs and Hamiltonian graphs	K3
CO4	Discuss the importance of Matchings and Colorings	K4
CO5	Apply the concept of Planarity including Euler identity	K3

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	M	S	M
CO2	M	S	M	M	S	M
CO3	S	S	M	S	M	S
CO4	M	M	S	S	M	S
CO5	M	S	S	M	S	S

S- Strong; M-Medium; L-Low

UNIT-I -GRAPHS, SUB GRAPHS AND TREES**18 Hours**

Graph– Graph isomorphism and simple graph - The Incidence and adjacency matrices- Subgraphs –Vertex degrees- Paths and Connection – Cycles –trees – Cut Edges and Bonds – Cut Vertices.

Chapter 1 [section 1.1 to 1.7]**Chapter 2 [section 2.1 to 2.3]****UNIT - II - CONNECTIVITY EULER TOURS AND HAMILTON CYCLES****18 Hours**

Connectivity – Blocks – Euler tours – Hamilton cycles.

Chapter 3 [section 3.1 to 3.2]**Chapter 4[section 4.1 to 4.2]****UNIT - III - MATCHINGS, EDGE COLORINGS****18 Hours**

Matching's- Matching's and coverings in Bipartite Graphs – Edge Chromatic Number – Vizing's Theorem.

Chapter 5 [section 5.1 - 5.2]**Chapter 6 [section 6.1 - 6.2]****Unit – IV - INDEPENDENT SETS AND CLIQUES, VERTEX COLOURINGS****18 Hours**

Independent sets – Ramsey's Theorem- Chromatic Number – Brooks' Theorem – Chromatic polynomials.

Chapter 7[section 7.1 – 7.2]**Chapter 8 [section 8.1-8.2, 8.4]****Unit-V - PLANAR GRAPHS****18 Hours**

Plane and Planar Graphs – Dual Graphs – Euler's Formula – The Five Colour Theorem and four colour conjecture.

Chapter 9 [section 9.1 – 9.3, 9.6]**DISTRIBUTION OF MARKS: THEORY 90% AND PROBLEMS 10%**

TEXT BOOKS:

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	J.A Bondy and USR Murty	Graph Theory With Applications	McMillan	1976

REFERENCE BOOKS:

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	J.Clark and D.A Holton	A first look at Graph theory	Allied publishers	1995
2	R.Gould	Graph theory	Benjamin / Cummings	1989
3	A.Gibbons	Algorithmic Graph Theory	Cambridge University Press	1989
4	R.J. Wilson	Introduction to Graph Theory	Pearson Education	2004
5	S.A. Choudum	A First Course in Graph Theory	MacMillan India Ltd	1987

WEB SOURCES:

1. <https://iversity.org/blog/introduction-graph-theory/>
2. <http://www.hamilton.ie/ollie/Downloads/Graph.pdf>

TEACHING METHODOLOGY

1. Class room Teaching
2. Assignments
3. Seminars
4. Discussions
- 5 .PPT Presentations

SYLLABUS DESIGNER:

1. Mrs. R.Ramya, Assistant Professor of Mathematics.