

Subject Code: 1SC2040404

Subject Title: Graph Theory –II

Course Objective:

- This course is designed to enable students to acquire understanding of the Spanning trees and enumeration, Optimization and trees, Eigen values of graphs, Matroids, its concepts and applications.

Teaching scheme (hours) per week		credit		Theory Marks		Practical Marks		Total
Theory	Tutorial	Theory	Tutorial	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	1	4	1	60	40	-	-	100

Subject Contents				
Unit. No	Topic	Total Hours	Weight (%)	
1	Spanning trees and enumeration: enumeration of trees in graphs, Cayley's formula, contraction by edge, matrix-tree theorem, decomposition and graceful labelling, separating sets.	18	25	
2	Optimization and trees: minimum spanning trees, Kruskal algorithm, shortest path -Dijkstra's algorithm, BFS method and applications. Network: Flows and cuts, Ford and Fulkerson algorithm.	18	25	
3	Eigen values of graphs, the characteristic polynomial, linear algebra of real symmetric matrices, eigen values and graph parameters, eigen values of regular graphs.	18	25	
4	Matroids: Hereditary systems & examples, properties of matroids. Ramsey theory: The Pigeonhole principle, Ramsey's theorem, Ramsey numbers	18	25	

Course Outcome:

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

- Understand the concept of Spanning trees and enumeration.
- Understand the concept of Optimization and trees.
- Know about the Eigen values of graphs and Matroids.

List of References:

- Narsingh Deo: Graph Theory with applications to Engg. And Computer Science. Prentice-Hall of India Pvt. Ltd., New Delhi, 1999.
- Douglas B. West: Introduction to Graph Theory.
- John Clark and D.A. Holton: A first look at graph theory Allied Publishing Ltd., 1991.
- Robin J. Wilson: Introduction to graph theory.