20BSM407T - GRAPH THEORY										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		TotalMarks
					MS	ES	IA	LW	LE/Viva	
3	1	--	4	4	25	50	25	--	--	100

OBJECTIVES

1. To understand the basic concept of graph theory
2. To learn graph theory based modeling and applying the same to solve real life problems
3. To study about trees and its shortest spanning algorithms

SYLLABUS

Unit-I	**10**

Graph Theory: Graphs and related definitions, Sub-graphs, homomorphism and isomorphism, paths and connectivity. Bipartite graph. Eulerian graph and Konigsberg bridge problem. Hamiltonian graph. Labeled and weighted graphs. Connected graphs, disconnected graphs and components, Euler graphs, Operations on graphs, More on Euler graphs, Hamiltonian paths and circuits.

UNIT II	**10**

Directed Graphs: Basic Definitions, Trees. Algebraic expressions and Polish notation. Sequential representation of Directed Graphs. Adjacency matrix. Shortest path. Binary trees, Strongly and weakly connected graphs, Rooted Trees, Minimum Spanning Tree, Warshall's algorithm – Shortest paths.

UNIT III	**10**

Cut set, and cut vertices, Planar and Dual Graph: Properties of a cut set, all cut sets in a graph, Fundamental circuits and cut sets, Network flows, Planar graph, kuratowski's Two Graphs, Detection of planarity, Dual of a graph, More on criteria of planarity.

UNIT IV	**9**

Graph Colorings: Chromatic number, Chromatics polynomial, Chromatic partitioning, Coverings, Four color problem, Representing graphs in computer memory.

UNIT-V	**13**

Useful NPTEL Lectures Link:

(1) https://nptel.ac.in/courses/106108054/
(2) https://nptel.ac.in/courses/111106050/
(3) https://nptel.ac.in/courses/111106102/
(4) https://nptel.ac.in/courses/106104170/

APPROXIMATE TOTAL	**52 Hours**

OUTCOMES

1. Design the computational aspects of mathematical problems.
2. Appreciate solutions to various classic problems related to the graph theory.
3. Use graph theory as a modelling tool for solving problems in various domains

TEXTS AND REFERENCES

1. 1. Deo, N., Graph Theory with Applications to engineering and computer science, Dover Publications, 2016.
2. West, D.B., Introduction to Graph theory, Pearson Education, PHI, 2002.
3. Rosen and Kenneth H., Discrete Mathematics and It's Applications, Tata McGraw Hill, 1999.
4. Kolman, B., Busby, R.C., and Ross S., Discrete Mathematical Structures, Prentice Hall, 2009.
5. Koshy, T. Discrete Mathematics with Applications, Academic Press, 2003.
6. Veerarajan, T., Discrete Mathematics with graph theory and combinatorics, Tata McGraw Hill, 2007.