

ST. JOSEPH'S COLLEGE (AUTONOMOUS) BENGALURU-27



Re-accredited with 'A++' GRADE with 3.79/4 CGPA by
NAAC Recognized by UGC as College of Excellence

DEPARTMENT OF MATHEMATICS

Syllabus for Bachelor of Science (Basic/Hons.)

Under National Education Policy

For Batch 2021 (Onwards)

Name of the Degree Program: B.Sc.

Discipline Core: Mathematics

Total Credits for the Program: 176 (till 8 semesters)

Starting year of implementation: 2021-22

**Third Semester
Open Elective -6**

MTOE -6: Graphs and their real-life applications

Teaching Hours : 3 Hours/Week	Credits: 3
Total Teaching Hours: 42 Hours	Max.Marks:100 (S.A.-60+I.A.-40)

Objective of the Paper: To give a broad view of concepts in basic graph theory with emphasis on real life applications

Unit I:

Introducing graphs through various graphs models such as Acquaintanceship and Friendship Graphs, Round Robin Tournaments, Airline Routes and Road Network, Web Graph, Graph Terminology, Special Types of Graphs: Complete Graphs, Paths, Cycles, Bipartite graphs, Directed Graph, hand shaking Lemma, Matching, Marriage Theorems, Traveling Salesman Problem.

(14 Hours)

Unit II:

Euler and Hamiltonian paths. Solving puzzles using Euler and Hamiltonian graphs. Planar graphs, three men and three utilities problem, Coloring of a graph and chromatic number of graphs, Map coloring Four Color Theorem, Application of coloring: scheduling exam timetable, frequency assignment.

(14 Hours)

Unit III:

Introduction to tree, Tree models such as Saturated Hydrocarbons and Rooted trees. Application of trees: Game Trees, Spanning tree and minimal spanning tree, application of spanning trees: The n Queens problem, Graph Coloring Problem. Prim's algorithm and Kruskal's algorithm to find the minimum spanning tree and its application to the road network and communication tree. (14 Hours)

Books for Study

- 1) Kenneth H. Rosen. Discrete Mathematics and its Applications, WCB McGraw-Hill. 8th edition, 2019.

Books for Reference

- 1) F. Harary. Graph Theory, Addison -Wesley, 1969.
- 2) G. Chartrand and Ping Zhang. Introduction to Graph Theory, McGrawHill, International edition 2005.

Blueprint

	Unit-I	Unit -II	Unit- III	Answering	Total
2 Marks	3	3	3	6/9	12
6 Marks	4	4	4	8/12	48
					60

