

Part A: Introduction

Program: Bachelor in Science (Degree/Honors)		Semester - VI	Session:2024-2025
1	Course Code	MSE-6	
2	Course Title	Graph Theory	
3	Course Type	Discipline Specific Elective (DSE)	
4	Pre-requisite(if any)	Basic discussion of Graph , Trees and matrices.	
5	Course Learning Outcome (CLO)	<p>This Course will enable the students to:</p> <ul style="list-style-type: none"> ➤ Appreciate the definition and basics of graphs along with types and their examples. ➤ Understand the definition of a tree and learn its applications to fundamental circuits. ➤ Know the applications of graph theory to network flows. ➤ Understand the notion of planarity of a graph. ➤ Relate the graph theory to the real-world problems. 	
6	Credit Value	4C	1Credit = 15 hours- Learning and observation
7	Total Marks	Maximum Marks :100	Minimum Passing Marks :40

Part B: Content of the Course

Total no of teaching – learning period =60 Periods (60 Hours)

Unit	Topics	No. of Periods
I	Paths, Circuits and Graph Isomorphisms : Definition and examples of a graph, Subgraph, Walks, Paths and circuits; Connected graphs, disconnected graphs and components of a graph; Euler and Hamiltonian graphs, Graph isomorphisms, Adjacency matrix and incidence matrix of a graph, Directed graphs and their elementary properties.	15
II	Planar Graphs : Planar graph, Euler theorem for a planar graph, Various representations of a planar graph, Dual of a planar graph, Detection of planarity, Kuratowski's theorem. Weighted graph, Travelling salesman problem, shortest path Dijkstra's algorithm.	15
III	Cut-Sets and Cut-Vertices : Cut-set of a graph and its properties, Fundamental circuits and cut-sets, Cut-vertices, Connectivity and separability, Network flows, 1- isomorphism and 2- isomorphism.	15
IV	Trees and Fundamental Circuits : Definition and properties of trees, Rooted and binary trees, Cayley's theorem on a counting tree, Spanning tree, Fundamental circuits, Minimal spanning trees in a connected graph.	15

Part C - Learning Resource

Text Books, Reference Books, Other Resources

1. R. Balakrishnan & K. Ranganathan (2012). A Textbook of Graph Theory. Springer.
2. Narsingh Deo (2016). Graph Theory with Applications to Engineering and Computer Science. Dover Publications.
3. Reinhard Diestel (2017). Graph Theory (5th edition). Springer.
4. Edgar G. Goodaire & Michael M. Parmenter (2018). Discrete Mathematics with Graph Theory (3rd edition). Pearson.
5. Douglas West (2017). Introduction to Graph Theory (2nd edition). Pearson.:

E-Recourses:

<https://onlinecourses.nptel.ac.in>

<https://epqp.inflibnet.aci.in>

<https://swayam.gov.in>

<https://www.mooc.org>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Comprehensive Evaluation (CCE): 20 Marks

Semester End Exam (SEE): 80 Marks

Internal Assessment: Continuous Comprehensive Evaluation(CCE)	Internal Test -02 of 10 Marks each Assignment/Seminar-01 Of 10 Marks	Better marks out of two test + obtained marks in Assignment shall be considered against 20 marks
Semester End Exam (SEE)	Paper-Two Section-A&B Section-A: Objective and short answer type question-1x10+3x10= 40 Marks Section-B: Descriptive answer type question Module wise- 10x4 =40 Marks	

Name and signature of convener & members of CBOS-

