



Indraprastha College for Women University of Delhi

Work Plan for ODD SEMESTER – 2026

Course Name:	B.Sc.(H)
Paper Title:	Introduction to Graph Theory
Unique Paper Code:	2354000014
Semester:	VII
Faculty:	Dr. Vijay Kumar Tripathi
Year:	2026-27

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Graphs, Types of Graphs and Basic Properties	1-2	Graphs and their representation
		3	Pseudographs, Subgraphs, Degree sequence
		4-5	Euler's theorem, Isomorphism of graphs
		6	Paths and circuits, Connected graphs
		7-8	Euler trails, Eulerian paths and circuits
		9	Hamiltonian paths and cycles
		10	Adjacency matrix, Weighted graphs.
		11-12	Travelling salesman problem, Dijkstra's algorithm.
II	Directed Graphs and Applications, Trees	13	The Chinese postman problem; Digraphs,
		14-15	Bellman-Ford algorithm, Tournaments,
		16-18	Directed network,
		19-20	Scheduling problem; Trees and their properties,
		21-22	Spanning trees, Kruskal's algorithm, Prim's algorithm,
		23-24	Acyclic digraphs and Bellman's algorithm.
III	Planar Graphs, Graph Coloring and Network Flows	25	Planar graphs, Euler's formula
		26	Kuratowski theorem

		27-28	Graph coloring, Applications of graph coloring
		29	Circuit testing and facilities design
		30	Flows and cuts, Max flow-min cut theorem
		31-32	Matchings, Hall's theorem.
		33	Revision

Unit	Contents/Syllabus
I	Graphs and their representation, Pseudographs, Subgraphs, Degree sequence, Euler's theorem, Isomorphism of graphs, Paths and circuits, Connected graphs, Euler trails and circuits, Hamiltonian paths and cycles, Adjacency matrix, Weighted graphs, Travelling salesman problem, Dijkstra's algorithm.
II	Directed Graphs and Applications, Trees (18 hours) The Chinese postman problem; Digraphs, Bellman-Ford algorithm, Tournaments, Directed network, Scheduling problem; Trees and their properties, Spanning trees, Kruskal's algorithm, Prim's algorithm, Acyclic digraphs and Bellman's algorithm.
III	Planar Graphs, Graph Coloring and Network Flows (15 hours) Planar graphs, Euler's formula, Kuratowski theorem, Graph coloring, Applications of graph coloring, Circuit testing and facilities design, Flows and cuts, Max flow-min cut theorem, Matchings, Hall's theorem.
S.No.	Name of Authors/Books/Publishers
1.	Goodaire, Edgar G., & Parmenter, Michael M. (2011). Discrete Mathematics with Graph Theory (3rd ed.). Pearson Education Pvt. Ltd. Indian Reprint.
2.	• Bondy, J. A. & Murty, U.S.R. (2008), Graph Theory with Applications. Springer. • Chartrand, Gary, & Zhang, P. (2012). A First Course in Graph Theory. Dover Publications. • Diestel, R. (1997). Graph Theory (Graduate Texts in Mathematics). Springer Verlag. • West, Douglas B. (2001). Introduction to graph theory (2nd ed.). Pearson India.

Paper Components			
Credits	Lecture (L)	Tutorial (T)	Practical (P)
	3	1	0
Assessment Scheme			
S.No.	Component	Marking Scheme	Total Marks

1	Internal Assessment		30
		• Assignment	
		• Class Test	
		• Attendance	
2.	Continuous Assessment (Tutorial)		40
		• Activity 1	
		• Activity 2	
		• Attendance	
3.	Practical		NA
		• Continuous Assessment	
		• End Term Written/Practical Exam	
		• Viva	
4.	End Semester Examination		90