Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Department of Mathematics (GE for PG Students)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
MAPGGE01	GE	**Introduction to Graph Theory**	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Fundamentals of the Graph Theory.

Course Outcomes

After the successful completion of this course students will be able to:

1. *understand and apply the basic axioms and concepts of Graph Theory*
2. *write and present theorems and proofs of Graph Theory*
3. *analyse the types of a Graph*
4. *illustrate the degree and nature of vertices*
5. *create trees with characteristics.*

Course Content:

UNIT – I
Definitions, examples of problems in graph theory. Adjacency and incidence matrices, isomorphisms.

UNIT – II
Paths, walks, cycles, components, cut-edges, cut-vertices.

UNIT – III
Bipartite graphs, Eulerian graphs. Vertex degrees, reconstruction conjecture

UNIT – IV
Degree sequences. Directed graphs, de Bruijn cycles

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MAPGGE01	GE	**Introduction to Graph Theory**	60	20	20	0	0	3	0	0	3

UNIT – V

Trees and forests, characterizations of trees, Spanning trees, radius, and diameter.

Texts:

1. Narsingh Deo, (2014) "Graph theory with applications to engineering and computer science", Prentice Hall Inc., New Delhi.
2. 2. Fred S. Roberts (1978), Graph Theory and Its Applications to Problems of Society, Odyssey Press, Dover, New Hampshire
3. 3. L.R. Foulds, (1993) "Graph Theory Applications", Narosa Publishing House, New Delhi.
4. 4.J. A. Bondy and U. S. R. Murty (1976), "Graph Theory with Applications", Elsevier Science Publishing Company Inc., New York.
5. 5. Jonathan L. Gross, Jay Yellen, Mark Anderson (2019) "Graph Theory and Its Applications" Third edition, CRC Press Taylor and Francis Group, New York.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
MAPGGE02	GE	**Operations Research**	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the Basics of Operations Research.

Course Outcomes

After the successful completion of this course students will be able to:

1. *understand and apply the basics of Linear Programming.*
2. *illustrate the graphical solutions of LP problems*
3. *apply the simplex method to LP problems*
4. *analyse the various Transportation and Assignment problems*
5. *apply and solve the Transportation and Assignment problems.*

Course Content:

Unit-1:

Linear Programming (LP): Introduction, structure of LP model, assumptions of LP model, mathematical model of LP problems, Examples of LP model formulation.

Unit-2:

Graphical Method: Introduction, Important definitions: solution, feasible solution, infeasible solution, basic solution, basic feasible solution, optimum solution, unbounded solution; graphical solution method of LP problem, Examples on maximization and minimization of LP problem.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
MAPGGE02	GE	**Operations Research**	60	20	20	0	0	3	0	0	3

Unit-3:

Simplex Method: Introduction, Standard form of an LP problem, Simplex algorithm for maximization and minimization case, Examples to solve LP problems using simplex method.

Unit-4:

Transportation Method: Introduction, Mathematical model of transportation problem, transportation algorithm, methods of finding initial solution of transportation problem (north-west corner and least cost method).

Unit-5:

Assignment Method: Introduction, Mathematical model of Assignment problem, solution methods of assignment problem, Hungarian method for solving assignment problem and its algorithm, examples on solving assignment problems.

Text Books:

1. Operations Research: Theory and Applications, By JK Sharma, Macmillan
2. Operations Research: Concepts, Problems and Solutions, By VK Kapoor, SC Sons.
3. G. Hadley: Linear Programming. Narosa, Reprint, 2002.
4. Hamdy A. Taha: Operations Research-An Introduction, Prentice Hall, 9th Edition, 2010.
5. F.S. Hillier. G.J. Lieberman: Introduction to Operations Research- Concepts and Cases, 9th Edition, Tata Mc-Graw Hill, 2010.

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