

Devi Ahilya University, Indore, India Institute of Engineering & Technology				MSc – I Year (Applied Mathematics) with Specialization in Computing & Informatics Semester- IV			
Subject Code & Name	Instructions Hours per Week			Credits			
AM4EM1: Operations Research-II	L	T	P	L	T	P	Total
	3	1	-	3	1	-	4
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- The course aims at making the students aware of the various techniques, which provides an analytical and objective basis for decisions. These techniques use scientific methods to problems arising from operations involving integrated men, machine and materials and provide a mathematical model to represent complex functional relationships.
- To develop the skills of decision making in dynamic business situations through quantitative analysis using different mathematical models like Strategies formulation with the help of game theory, PERT and CPM etc.

Prerequisite(s): Basic knowledge of differentiation & integration of functions, vector algebra, determinants & matrices and calculus of finite difference.

COURSE OF CONTENTS

UNIT I

Non-Linear Programming: Kuhn Tucker conditions, Quadratic and Convex Programming. Dynamic Programming; Characteristics, Dynamic programming approach, Optimal subdivision problem.

UNIT II

Information Theory: Basic ideas, Mathematical definition of information, Measure of uncertainty and properties of entropy function, Communication system, joint and conditional entropies, Channel Capacity, Efficiency and redundancy Encoding, Shannon Fano Method.

UNIT III

Basic steps in PERT and CPM, PERT computation, CPM computation, critical path, Float, Cost analysis, Crashing the network, Contracting, Updating, Resource Scheduling, application of Network Techniques.

UNIT IV

Game theory-Maxmin-minimax criterion, Two persons zero sum games, Games with Mixed Strategies, Dominance Property, Graphical solution of two persons game, Matrix Game and its Relation with Linear Programming,

UNIT V

LP solutions of bidding models, N-person Non-zero sum games, Cooperative Games.

Learning Outcomes:

On completion of this course you should be able to:

- Know the various strategies required in business decisions using game theory.
- Know the project implementation and control techniques using network analysis.
- Understand how to model and solve problems using dynamic programming.
- Learn optimality conditions for single- and multiple-variable unconstrained and constrained nonlinear optimization problems, and corresponding solution methodologies.

BOOKS RECOMMENDED:

1. Hillier, F. S. and Lieberman, G. J. – Introduction to Operation Research, 8th Ed., New York, McGraw-Hill, 2005.
2. Taha, H. A. – Operations Research: An Introduction, 7thed., Macmillan Publication Co.,2003.
3. Sharma, S.D. – Operations Research, KedarnathRamnath& Co., Meerut, 2004.
4. Dantzig G., Thapa M. Linear programming 1: Introduction, Springer, 1997.
5. P K Gupta & D S Hira, Operations Research, S. Chand., 2008.
6. J.K. Sharma, Operations Research: Theory and Application, 3rd Ed., Macmillan, 2006.
7. E. N. Barron. Game Theory: An Introduction, 2nd Edition, John Wiley & Sons, Inc., 2013.
8. Y. Narahari. Game Theory-Lecture Notes, Department of Computer Science and Automation Indian Institute of Science Bangalore, India, 2012.
9. Martin J. Osborne, Ariel Rubinstein. A Course in Game Theory. Cambridge, MA: MIT, 1994.