



RAMA UNIVERSITY UTTAR PRADESH, KANPUR

(vide U.P. Act No. 1 of 2014 as passed by State Legislature and recognized by UGC U/s 2(f))



MEOE 002 INTRODUCTION TO OPERATION RESEARCH

L	T	P	Credit
3	0	0	3

Course Outcomes: At the end of the course, the student will be able to:

MEOE-002.1	Define and formulate linear programming problems and appreciate their limitations.
MEOE-002.2	Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained and translate solutions into directives for action.
MEOE-002.3	Conduct and interpret post-optimal and sensitivity analysis and explain the primal-dual relationship.
MEOE-002.4	Develop mathematical skills to analyse and solve integer programming and network models arising from a wide range of applications.
MEOE-002.5	Effectively communicate ideas, explain procedures and interpret results and solutions in written and electronic forms to different audiences.

Mapping of course outcomes with program outcomes

CO	PO1: Engineering knowledge	PO2 Problem analysis	PO3: Design/development of solutions	PO4: Conduct investigations of complex problems	PO5: Modern tool usage	PO6: The engineer and society	PO7: Environment and sustainability	PO8: Ethics	PO9: Individual and team work	PO10: Communication	PO11: Project management and finance	PO12: Life-long learning
MEOE-002.1	3	-	3	3	-	-	-	-	-	1	2	2
MEOE-002.2	3	3	3	3	1	-	-	-	-	1	-	2
MEOE-002.3	3	2	2	3	-	-	-	-	-	3	-	2
MEOE-002.4	3	3	3	3	-	-	-	2	1	1	1	2
MEOE-002.5	3	3	3	3	-	-	-	2	1	2	1	3

UNIT 1 Introduction

- 1.1 Definition and scope of operations research (OR), OR model
- 1.2 Solving the OR model, art of modeling, phases of OR study
- 1.3 Linear Programming: Two variable Linear Programming model
- 1.4 Graphical method of solution
- 1.5 Simplex method

UNIT 2 Transportation Problems

- 2.1 Types of transportation problems
- 2.2 Mathematical models, transportation algorithms
- 2.3 Assignment: Allocation and assignment problems and models
- 2.4 Processing of job through machines



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UNIT 3 Network Techniques

- 3.1** Shortest path model
- 3.2** Project Management: Phases of project management
- 3.3** Guidelines for network construction
- 3.4** CPM and PERT

UNIT 4 Theory of Games

- 4.1** Minima theorem
- 4.2** Graphical solution of $2 \times n$ or $m \times 2$ games
- 4.3** Reduction to linear programming model
- 4.4** Quality Systems: Elements of Queuing model

UNIT 5 Inventory Control

- 5.1** Models of inventory
- 5.2** operation of inventory system, quantity discount
- 5.3** Replacement models: Equipment's that deteriorate with time

Text/Reference Books:

1. Wayne L. Winston, "Operations Research" Thomson Learning, 2003.
2. Hamdy H. Taha, "Operations Research-An Introduction" Pearson Education, 2003.
3. R. Panneer Seevam, "Operations Research" PHI Learning, 2008.
4. V.K.Khanna, "Total Quality Management" New Age International, 2008.