

OPERATIONS RESEARCH
Open Elective – I

Coursecode	23ME2501	Year	III	Semester	I
Course category	Open Elective-I	Branch	ME	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	NIL
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes:		
At the end of the course, student will be able to		
CO	Statement	Blooms Level
CO1	Understand the basics of linear programming, transportation, queuing, sequencing of jobs, replacement and simulation problems	L2
CO2	Apply linear programming, transportation and assignment models to solve real life problems	L3
CO3	Apply Sequencing, queuing, Game and Replacement and project management theories to solve problems	L3
CO4	Apply dynamic programming and simulation models	L3

Contribution of Course outcomes towards the achievement of program outcomes & Strength of correlations (High:3, Medium:2, Low:1)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3							3	2		3	2
CO2	3	3							3	2		3	2
CO3	3	3							3	2		3	2
CO4	3	3							3	2		3	2
CO5	3	3							3	2		3	2

SYLLABUS		
UNIT	Contents	Mapped CO
I	INTRODUCTION - definition- characteristics and phases – types of operation research models – applications. Linear programming: Problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle.	CO1 CO2
II	TRANSPORTATION PROBLEM: Formulation – optimal solution, unbalanced transportation problem – degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem- travelling salesman problem. SEQUENCING – Introduction – flow –shop sequencing – n jobs through two machines – n jobs through three machines – job shop sequencing – two jobs through ‘m’ machines.	CO1 CO2

III	<p>REPLACEMENT THEORY: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement.</p> <p>GAME THEORY: Introduction – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2 & 2 x n games -graphical method.</p>	CO1 CO3
IV	<p>WAITING LINES: Introduction – single channel – poisson arrivals – exponential service times – with infinite population and finite population models– multichannel – poisson arrivals – exponential service times with infinite population single channel.</p> <p>PROJECT MANAGEMENT: Basics for construction of network diagram, Program Evaluation and Review Technique (PERT), Critical Path Method (CPM) – PERT Vs. CPM, determination of floats- Project crashing and its procedure.</p>	CO1 CO4
V	<p>DYNAMIC PROGRAMMING: Introduction – Bellman’s principle of optimality – applications of dynamic programming: shortest path problem – linear programming problem.</p> <p>SIMULATION: Definition – types of simulation models – phases of simulation– applications of simulation – advantages and disadvantages</p>	CO1 CO5

Learning Resources

Text Books:

1. Operations Research-An Introduction/Hamdy A Taha/Pearson publishers
2. Operations Research –Theory & publications / S.D.SharmaKedarnath/McMillan publishers India Ltd

References:

1. Introduction to O.R/Hiller &Libermann/TMH
2. Operations Research /A.M. Natarajan, P. Balasubramani, A. Tamilarasi /Pearson Education.
3. Operations Research: Methods & Problems / Maurice Saseini, ArhurYaspan& Lawrence Friedman/Wiley
4. Operations Research / R.Pannerselvam/ PHI Publications.
5. Operations Research / Wagner/ PHI Publications.
6. Operation Research /J.K.Sharma/Macmillan Publ.
7. Operations Research/ Pai/ Oxford Publications
8. Operations Research/S Kalavathy / Vikas Publishers
9. Operations Research / DS Cheema/University Science Press
10. Operations Research / Ravindran, Philips, Solberg / Wiley publishers