

OPERATIONS RESEARCH

Course code	23HS1703	Year	IV	Semester	I
Course category	Management Course- II	Offering Branch	ME	Course Type	Theory
Credits	2	L-T-P	2-0-0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes: Upon successful completion of the course, the student will be able to

	Statement	Skill	BTL	Units
CO1	Analyze linear programming problems by formulating models and comparing graphical and simplex solution approaches.	Analyze	L4	1
CO2	Analyze transportation, assignment, and sequencing problems to evaluate and select optimal operational strategies.	Analyze	L4	2
CO3	Analyze replacement scenarios and competitive situations using game theory to determine effective decision strategies.	Analyze	L4	3
CO4	Analyze queuing systems and inventory models to assess system performance and optimize service and stock control policies.	Analyze	L4	4
CO5	Analyze multistage decision processes and simulation models to interpret system behavior and support real-life decision-making.	Analyze	L4	5

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	2	2						2	3	2
CO2	3	3	3	2	2	1					2	3	2
CO3	2	3	2	3	2	2					2	3	2
CO4	3	3	3	3	3	2					2	3	2
CO5	3	3	3	3	3	2					3	3	2

Syllabus			
UNIT	Contents	Mapped CO	
I	INTRODUCTION - definition– characteristics and phases – types of operation research models – applications. LINEAR PROGRAMMING: Linear programming problem formulation – graphical solution – simplex method – artificial variables techniques -two–phase method, big-M method – duality principle	CO1	
II	TRANSPORTATION PROBLEM: Formulation – Basic Feasible Solution, 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	CO2	
III	REPLACEMENT: Introduction – replacement of items that deteriorate with time – when money value is not counted and counted – replacement of items that fail completely, group replacement. THEORY OF GAMES: Introduction – mini. max (max. mini) – criterion	CO3	

	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.	
IV	QUEUEING THEORY: 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. INVENTORY CONTROL: Introduction – single item – deterministic models – purchase inventory models with one price break and multiple price breaks – shortages are not allowed – stochastic models – demand may be discrete variable or continuous variable, Instantaneous demand and continuous demand and no set up cost. ABC & VED Analysis	CO4
V	DYNAMIC PROGRAMMING: Introduction – Bellman’s principle of optimality – shortest path problem. SIMULATION: Definition – types of simulation models – phases of simulation– applications of simulation – inventory problems	CO5

Learning Resource	
Text books:	
1. Operations Research-An Introduction/Hamdy A Taha/Pearson publishers 2. Operations Research –Theory & publications / S.D.Sharma-Kedarnath/McMillan publishers India Ltd	
Reference books	
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/MacMilan 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	
E-Resources & other digital Material:	
1. http://nptel.ac.in/courses/112106134/ 2. http://nptel.ac.in/courses/112106131/	