

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VII
MANUFACTURING ENGINEERING

Subject Name: Operations Research (Department Elective – I)

Subject Code:173405

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam(E)	University Exam(P)	Mid Sem Exam(Theory) (M)	Practical (Internal)
3	1	0	4	70	0	30	50

Sr No	Course Contents
1	Linear Programming Definition of Operations Research: objectives, Simplex methods for maximization and minimization problems, Degeneracy in L.P., Duality in L. P., Sensitivity analysis, Revised simplex method.
2	Transportation and Assignment Problem Structure, industrial and business application, Transportation problems - use of various methods for solving transportation problem, degeneracy and its solution, transshipment problem. Assignment problem- solutions of various types of problems, travelling salesman problem.
3	Introduction to Integer, Dynamic and Non-linear Programming Integer programming, Branch & Bound Method, Goal Programming, Dynamic Programming Introduction, application, capital budgeting, different problems solved by dynamic programming. Introduction to Geometric and Goal Programming Geometric and Goal Programming - Definition, Introduction, application of Geometric and Goal Programming
4	Replacement Models Replacement of capital equipments that deteriorates with time, time value of money: cases of remains same and changes with constant rates during period. Equipment renewal policy, group and individual replacement. Games Theory Introduction, two person zero sum game, minimax and maximin principle, saddle point, methods for solving game problems with mixed strategies, Graphical and iterative methods, Solution using LP.
5	Queuing Theory Operating characteristics, Poisson single and multi-channel queuing system M/M/1: ∞ / FCFS, Monte Carlo simulation of queuing systems. Inventory Theory Introduction - Meaning of Inventory Control. Functional classifications of Inventories - Advantages of Inventory Control - Costs associated with Inventories - Advantages of Inventory Control - Costs associated with Inventories. Deterministic Inventory Models: economic lot size with instantaneous replenishment with and without shortage costs,

	economic lot size with finite replenishment with and without shortage, economic lot size models with quantity discount.
6	<p>Network Modeling</p> <p>Fundamentals of CPM. and PERT networks, CPM: Construction of networks, critical paths, forward and backward pass, floats and their significance, crashing for optimum and/or minimum duration and the cost, resource allocation and leveling.</p> <p>PERT: Time estimates, construction of networks, probability of completing projects by given date.</p>

Text Books

1. Sharma S.D., "Operations Research", Kedarnath Ramnath & Company Publications.
2. Gupta P.K., Hira D.S., "Operations Research", S.Chand and Co. Ltd., New Delhi
3. Taha H.A., "Operations Research - An Introduction", Prentice Hall Pvt. Ltd.

Reference Books

1. Hillier F.S., Lieberman G.J., "Introduction to Operations Research", Tata McGraw-Hill,
2. Wagner H.M., "Principles of Operations Research", Prentice-Hall India,
3. Ravindran A., "Operations Research", Tata McGraw-Hill. New Delhi
4. Basu S.K., Pal D.K., and Bagchi H., "Operations Research for Engineers", Oxford and IBH Publishing Co. Pvt. Ltd.,
5. Panneerselvam R., "Operations Research", Prentice Hall of India Ltd., New Delhi