

SCSA5105	ADVANCED OPTIMIZATION TECHNIQUES	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To learn linear and non linear programming problem.
- To understand the concept of queuing model, simulation and decision theory.

UNIT 1 INTRODUCTION TO OPTIMIZATION**9 Hrs.**

Formulation of optimization problem- Simplex Method - Big M Method - Two phase method - Dual Simplex method - Integer Programming- Gomory All Integer cutting plane Method-Gomory Mixed Integer Method-Branch and Bound Method

UNIT 2 NON LINEAR PROGRAMMING**9 Hrs.**

Introduction – Unconstrained and Constrained Optimization- Kuhn Tucker conditions- Relative Maximum and Minimum values- Method of Lagrangian Multipliers- Hessian Matrix- Quadratic programming- Wolfe's Modified Simplex Method – Problems

UNIT 3 DYNAMIC PROGRAMMING**9 Hrs.**

Recursive relationship - Solution to recursive equation - Dynamic Programming Algorithm - Principle of Optimality - Maximum and minimum values - Solution of LPP by Dynamic Programming - Multi stage problem

UNIT 4 QUEUEING NETWORKS**9 Hrs.**

Introduction to Concept of Queuing Models - Single Server - Multiple server Models - Problems - Pollaczek Khinchine theorem. Theoretical concepts of Open queuing networks (Theory) - Closed Queuing Networks (Theory) - Queues in series (Theory).

UNIT 5 DECISION ANALYSIS AND SIMULATION**9 Hrs.**

Introduction to Decision Making process – Elements – Decision making under uncertainty – Maximin and Maximax criteria- Hurwitz criterion – Laplace criterion – Minimax Regret criterion – Decision tree analysis- Problems - Simulation - Nature and need for simulation - Monte Carlo method – Applications to Queuing systems.

Max. 45 Hrs.**TEXT / REFERENCE BOOKS**

1. J.K. Sharma, "Operations Research Theory and Applications", 4th Edition, Macmillan India Ltd., 2010.
2. F.S.Hillier & G.J. Lieberman, "Introduction to Mathematical Programming", McGraw Hill International Edition.
3. H.A.Taha "Operations Research: An Introduction", 6th Edition, Macmillan.
4. Prem Kumar Gupta and D.S. Hira, "Operations research", S Chand, 2000.
5. Sharma .S.D, "Operations Research", Kedarnath Ramnath & Co, 2002.
6. Gupta. P.K and Man Mohan "Problems in Operations Research", Sultan Chand and Sons, 7th Edition, 1995.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3 Hrs.****PART A:** 5 Questions of 6 Marks each – No choice**30 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 14 Marks**70 Marks**