

MC124-Computer Based Optimization Techniques

Objectives: To well ground students in the mathematical, engineering, and modeling skills that are the basis for computer based optimization techniques, and they will be prepared to apply those skills to the efficient design, analysis, operation and control of complex systems.

Learning Outcomes:

- Proficiency with tools from optimization, probability, statistics, simulation, and engineering economic analysis, including fundamental applications of those tools in industry contexts involving uncertainty and scarce or expensive resources.
- Facility with mathematical and computational modeling of real decision-making problems, including the use of modeling tools and computational tools, as well as analytic skills to evaluate the problems.
- Facility with the design, implementation, and analysis of computational experiments.

UNIT - I (10 Hrs)

Introduction: History and Development of OR, Types of models, General methods for solving Operations Research models, Characteristics, Phases, scientific method. **Linear Programming And IT's Applications:** Introduction, Linear programming formulation, Graphical solution, Simplex method, Artificial variable technique and Duality principle.

Transportation Problem: Mathematical formulation, Optimal solution, Degeneracy and Un-balanced Transportation problem. **Assignment Problem:** Mathematical formulation, Optimal solution, Un-balanced assignment problem and variations.

UNIT - II (13 Hrs)

Replacement: Introduction, replacement of items that deteriorate when money value is not constant and constant, replacement of items that fail completely. **Job Sequencing:** Introduction, Principal assumption, solution of sequencing problem, optimal solution for processing n-jobs through two, three machines.

UNIT - III (13 Hrs)

Inventory Control: Meaning of. Inventory Control, Types, Reasons for carrying Inventory, economic lot size, quantity discounts, Deterministic models.

UNIT - IV (12 Hrs)

Network Models : Definitions – CPM and PERT – Their Algorithms Integer Programming : Branch and Bound Algorithms cutting plan algorithm.

UNIT - V (12 Hrs)

Theory of Games: Introduction, Minimax (maximin) criterion and optimal strategy, solution of games with saddle points, rectangular games with out saddle points, 2 X 2 games, dominance principle, m X 2 & 2 X n games, graphical method.

Dynamic Programming: Introduction, Bellman's Principle of optimality, solution of problem with finite number of stages, shortest path problem, linear programming problem.

TEXT BOOKS :

1. S.D.SHARMA : Operations Research
2. P.K.GUPTA & D.S.HIRA : Operations Research

REFERENCE BOOKS :

1. R.D.ASRHEDKAR & R.V.KULKARNI : Operations Research.
2. KAPPOR V.K : Operations Research