

BBA 501-18-Operation Research

Course objective: This course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in use of quantitative techniques for optimum decision making and to facilitate the students in understanding the need/significance and applications of various techniques of operation research in decision making.

Course Outcomes: After the course the student will be able to:

CO1: Formulate and solve simple and complex optimization problems.

CO2: Formulate and solve transportation and assignment problems for cost minimization.

CO3: Formulate and solve job sequencing and network models.

CO4: Carry out economical replacement analysis for obsolete /worn out industrial equipment.

CO5: Formulate and solve different inventory model problems.

UNIT-I

Introduction: Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research.

Linear Programming Problem – Formulation of LPP, Graphical solution of LPP. Simplex Method, Artificial variables, Big-M method, two-phase method, degeneracy and unbound solutions.

UNIT-II

Transportation Problem: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the stepping stone method and MODI method.

Assignment Model: Formulation, Hungarian method for optimal solution, Solving unbalanced problem, Travelling salesman problem and assignment problem.

UNIT-III

Sequencing Models: Solution of Sequencing Problem, Processing n Jobs through 2 Machines, Processing n Jobs through 3 Machines.

Network Models: PERT & CPM, Introduction, analysis of time bound project situations, construction of net works, identification of critical path, slack and float, crashing of network for cost reduction.

UNIT-IV

Replacement Models: Replacement of Items that deteriorate whose maintenance costs increase with time without change in the money value. Replacement of items that fail suddenly: individual replacement policy, group replacement policy.

Inventory Models: Inventory costs. Models with deterministic demand model (a) demand rate uniform and production rate infinite, model (b) demand rate non-uniform and production rate infinite, model (c) demand rate uniform and production rate finite.

Suggested Readings:

1. Wagner, HM, *Principles of Operations Research*; Prentice Hall.
2. Gupta, PK and Hira, DS, *Operations Research*, S. Chand & Co.
3. Taha, *Introduction to Operation Research*; Pearson.
4. Hiller, F.S. and Libermann, G.I. *Introduction to Operation Research*; Holden Ray.
5. Sharma, J.K. *Operations Research Theory & Applications*; Macmillan India Ltd.
6. Sharma J.K. *Operations Research, Problems and Solutions*; Macmillan India Ltd.