AMIT-14 OPERATION RESEARCH

UNIT-1 CLASSIFICATION OF O.R. MODELS

1.1 Physical Models, Symbolic Models, Advantages of A Model, Limitations Of The Model, Scope Of Operations Research In Management

UNIT-2 LINEAR PROGRAMMING FORMULATION & GRAPHICAL METHOD

1.1 Introduction, Basic Requirements, Basic Assumptions, Advantages of Linear Programming, Limitations of Linear Programming,

1.2 Application Areas Of Linear Programming, Formulation Of Linear Programming Models

UNIT-3 TRANSPORTATION

3.1 Example, Agriculture, General Mathematical Formulation of Linear Programming Problem, Definitions

UNIT-4 SOME SPECIAL CASES

4.1 Multiple Optimal Solutions, Infeasible Solution, Contradictory Constraints, Unbounded Solution

UNIT-5 LINEAR PROGRAMMING

5.1 The Simplex Method, Introduction, Standard Form of Linear Programming Problem, Slack And Surplus Variables, Slack Variable

UNIT-6 STEPS OF THE SIMPLEX METHOD

6.1 Steps of the Simplex Method (Maximization Case), Flow Chart of the Simplex Method, Simplex Method (Minimization Case),

6.2 Steps of the Simplex Method (Minimization Case), Maximization Case (Constraints of Mixed Type), Resolution of Degeneracy

UNIT-7 LINEAR PROGRAMMING, DUALITY

7.1 Introduction, Formulation Of Dual Problem, Interpreting Primal-Dual Optimal Solutions, Solving The Primal-Dual Problem,

7.2 Dual Of A Primal With Mixed Constraints, Important Primal-Dual Results, Advantages Of Duality, The Dual Simplex Method

UNIT-8 TRANSPORTATION PROBLEM

8.1 Methods For Finding Initial Solution, North-West Corner Method (NWCM), Least Cost Method (LCM), Vogel's Approximation Method (VAM),

8.2 Stepping-Stone Method, The Dual of Transportation Problem, Alternative Optimal Solutions, Unbalanced Transportation Problems,

8.3 Supply Exceeds Demand, Demand Exceeds Supply, Degeneracy in the Transportation Problem, Prohibited Routes, Profit Maximization in a Transportation Problem,

8.4 Trans-shipment Problem, Time-Cost Trade-of in the Transportation problem

UNIT-9 HUNGARIAN METHOD OF ASSIGNMENT PROBLEM

9.1 Minimization Case, Variations Of The Assignment Problem, An Application--Airline Crew Assignment, Travelling Salesman Problem

UNIT-10 NETWORK MODELS: PERT & CPM

10.1 Objectives of network analysis, Application of network models, Advantages of network models, Project network,

10.2 Difference between PERT and CPM, Activities, Events, Estimating Activity Times, Effect of Introducing a Dummy Activity in a Network,

10.3 Probability Statements or Project Duration, Probability of completing the project on or before a specified time, PERT algorithm.

UNIT-11 FLOAT OF AN ACTIVITY

11.1 Introduction, Optimization of Project Time and Cost in a PERT Network, Limitations of PERT/CPM

UNIT-12 QUEUING MODELS

12.1 Basic Components of the Queuing System, Input Source, Queue Discipline, Service Mechanism, Classification of Queuing Systems, Characteristics of Model I, II, III

UNIT-13 INVENTORY CONTROL MODELS

13.1 Principal Categories of Inventories and Their Functions, Structure of Inventory Management System, The Basic Deterministic Inventory models,

13.2 Multiple Item Deterministic Models, Limitation set up by capital restriction, Aggregate resource limitations, Selective Inventory Control,

13.3 Application of ABC analysis, Inventory Control Systems, Reorder level, Probabilistic Models

UNIT-14. SYSTEM TERMINOLOGY

14.1 System and Simulation models, Random Variable and Random Numbers, Monte-Carlo Simulation, Generation of Random Numbers,

14.2 Simulation and Inventory Control, Simulation and Queuing System, Simulation and Capital Budgeting , Limitations of Simulation, Simulation Languages, Simulation Applications

Reference Books:

1. Operations Research: A Practical Introduction Book by Camille C. Price, Ghaith Rabadi, and Michael W. Carter
2. Operations Research: An Introduction Book by Hamdy A. Taha
3. Operations Research and Management Science Handbook by A. Ravi Ravindran