

Unit-I

Chapter 1 : Linear Programming 1-1 to 1-58

Syllabus :

- 1.1 Various definitions, statements of basic theorems and properties, Advantages and Limitations,
- 1.2 Application areas of Linear programming
- 1.3 Linear Programming– Concept
- 1.4 Simplex Method and Problems
- 1.5 Two Phase Simplex Method and problems

Note : Case study-based problems

Extra Readings : Formulation of Linear programming, Solution of LPP using Graphical method.

- 1.1 Introduction..... 1-1
- 1.2 Introduction to Linear Programming Problem (LPP) 1-2
 - 1.2.1 Solved Examples 1-3
- 1.3 Graphical Method to Solve LPP 1-5
 - 1.3.1 The Canonical Form 1-11
 - 1.3.2 The Standard Form of LPP 1-11
- 1.4 Basic Terminology 1-11
 - 1.4.1 Alternate Solution 1-22
 - 1.4.2 Unbounded Solution 1-23
- 1.5 Simplex Method to Solve Minimization Type LPP 1-24
- 1.6 The BIG-M-Method (Use of Artificial Variables)..... 1-26
 - 1.6.1 Solved Examples 1-26
- 1.7 Duality 1-33
 - 1.7.1 Advantages of Dual 1-34
 - 1.7.2 Solution Primal using Dual 1-36
- 1.8 The Two Phase Method 1-45
- 1.9 University Questions and Answers 1-57

Unit-II

Chapter 2 : Markov Chains & Simulation Techniques 2-1 to 2-18

Syllabus :

- 2.1 Markov chains : Applications related to technical functional areas,
- 2.2 Steady state Probabilities and its implications,
- 2.3 Decision making based on the inferences Monte Carlo Simulation.

Extra Readings : Application of Markov chain in Queuing theory, Simulation techniques used in Machine learning and bioinformatics.

- 2.1 Introduction..... 2-1
- 2.2 Basic Terminology 2-1
- 2.3 Multi-period Transition Probabilities 2-2
- 2.4 Steady State (Equilibrium) Condition for Markov Chain 2-6
- 2.5 Applications of Markov (Chain) Analysis 2-8
- 2.6 Simulation..... 2-8
 - 2.6.1 Types of Simulation 2-8
 - 2.6.2 Steps of Simulation Process 2-8
 - 2.6.3 Advantages and Disadvantages of Simulation 2-9
- 2.7 Simulation Model or Process..... 2-9
 - 2.7.1 Monte Carlo Simulation Model: 2-9

Unit-III

Chapter 3 : Sequential Model and Related Problems 3-1 to 3-14

Syllabus :

- 3.1 Processing n jobs through 2 machine
- 3.2 Processing n jobs through 3 machine
- 3.3 Processing n jobs through m machine

Extra Readings : Processing of n jobs through m Machines

3.1 Introduction.....3-1
 3.2 Basic Terminology3-1
 3.3 Assumptions.....3-2
 3.4 Processing n Jobs through Two Machines.....3-2
 3.5 Algorithm.....3-2
 3.5.1 Solved Examples.....3-3
 3.6 Processing Jobs Through 3 Machines.....3-10

Unit-IV

Chapter 4 : PERT and CPM 4-1 to 4-30

Syllabus :
 4.1 Basic differences between PERT and CPM.
 4.2 Network diagram.
 4.3 Time estimates (Forward Pass Computation, Backward Pass Computation.
 4.4 Critical Path.
 4.5 Probability of meeting scheduled date of completion,
 4.6 Calculation on CPM network.
 4.7 Various floats for activities
 4.8 Event Slack.
 4.9 Calculation on PERT network.
 4.10 Application of schedule based on cost analysis and crashing.
 4.11 Case study-based problems.
Extra Readings : Optimal Cost estimation by crashing the network, Explore the MS Project tool.

4.1 Introduction.....4-1
 4.2 Basic Difference Between PERT and CPM.....4-1
 4.3 Phases of Project Management4-2
 4.4 Applications of PERT and CPM.....4-2
 4.5 Basic Terminology4-3
 4.6 Network Diagram / Arrow Diagram.....4-4

4.7 Network Analysis4-6
 4.8 Critical Path and Varies Floats for Activities.....4-8
 4.9 Project Evaluation and Review Technique (PERT)4-11
 4.9.1 Steps in Solution of PERT Problem.....4-11
 4.10 Project Time Cost Trade - off4-21

Unit-V

Chapter 5 : Game Theory 5-1 to 5-26

Syllabus :
 5.1 Introduction
 5.2 n X m zero sum game with dominance
 5.3 Solution using Algebraic, Arithmetic and Matrix strategy
Extra Readings : Learn the difference between Sequential and Simultaneous game
 5.1 Introduction.....5-1
 5.2 Competitive Games.....5-1
 5.3 Useful Terminology5-1
 5.4 Two Person Zero Sum Game with Saddle Point5-2
 5.5 Two Person Zero Sum Game Without Saddle Point.....5-8
 5.6 Algebraic Method for Solving 2 x 2 Game Without Saddle Point :5-8
 5.7 Dominance Method (Solution of m x n Game without Saddle point)5-12

Unit-VI

Chapter 6 : Decision Analysis 6-1 to 6-16

Syllabus
 6.1 Introduction to Decision Analysis
 6.2 Types of Decision-making environment
 6.3 Decision making under uncertainty and under risk
 6.4 Concept of Decision Tree
Extra Readings : Decision models in Econometrics and computer science

6.1	Introduction.....	6-1	6.3.1	Decision-Making Under Uncertainty	6-2
6.2	Elements of Decision Analysis	6-1	6.3.2	Decision Making Under Risk.....	6-4
6.3	Types of Decision-Making Environments.....	6-2	6.4	Decision Tree Analysis.....	12
