

SEC1-N OPERATIONAL RESEARCH & OPTIMIZATION TECHNIQUES

Unit 1. Modeling with Linear Programming

- 1.1 Two variable LP Model
- 1.2 Graphical LP solution
- 1.3 Selected LP Applications
- 1.4 Graphical Sensitivity analysis.

Unit 2. The Simplex Method

- 2.1 LP Model in equation form
- 2.2 Transition from graphical to algebraic solutions
- 2.3 The simplex method
- 2.4 Artificial starting solutions.

Unit 3. Duality

- 3.1 Definition of the dual problem
- 3.2 Primal dual relationship.

Unit 4. Transportation Model

- 4.1 Definition of the Transportation model
- 4.2 The Transportation algorithm.

Unit 5. The Assignment Model

- 5.1 The Hungarian method
- 5.2 Simplex explanation of the Hungarian method.

Unit 6. Network Models

- 6.1 CPM and PERT
- 6.2 Network representation
- 6.3 Critical Path Computations
- 6.4 Construction of the time schedule,
- 6.5 Linear programming formulation of CPM
- 6.6 PERT calculations.

Unit 7. Decision Analysis and Games

- 7.1 Decision under uncertainty
- 7.2 Game theory

- 7.3 Some basic terminologies
- 7.4 Optimal solution of two person zero sum game
- 7.5 Solution of mixed strategy games
- 7.6 Graphical solution of games
- 7.7 Linear programming solution of games.

Unit 8. Replacement and Maintenance Models

- 8.1 Introduction
- 8.2 Types of failure
- 8.3 Replacement of items whose efficiency deteriorates with time

Unit 9. Sequencing Problems

- 9.1 Introduction
- 9.2 Notation, terminology and assumptions,
- 9.3 Processing n jobs through two machines
- 9.4 Processing n jobs through three machines.

Unit 10. Classical Optimization Theory

- 10.1 Unconstrained problems
- 10.2 Necessary and sufficient conditions
- 10.3 Newton Raphson method
- 10.4 Constrained problems
- 10.5 Equality constraints (Lagrangian Method Only).