Operations Research
[MB-302]
Credits : 4

1. LINEAR PROGRAMMING   [12L]
a) Formulation of LP Models
b) Graphical LP Solution
c) Simplex Method
d) Artificial Variables – Big M - Method and Two-phase Method
e) Duality, Sensitivity Analysis, Shadow Price and their economic interpretation
Software package to be used in (b), (c), (d) and (e) above.

2. TRANSPORTATION, TRANSHIPMENT AND ASSIGNMENT MODELS   [6L]
a) Construction of Transportation, Transshipment and Assignment Models
b) The Transportation Algorithm
c) The Hungarian Method for the Assignment Problem
d) The Transshipment problem
Software package to be used for implementing the algorithms.

3. GOAL PROGRAMMING   [3L]
a) Construction of Goal Programming Models
b) Goal Programming Algorithms

4. INTEGER LINEAR PROGRAMMING   [4L]
a) ILP Algorithms - Branch and Bound, Cutting Plane Algorithm

5. DECISION ANALYSIS   [4L]
a) Decision Making under Certainty – Analytic Hierarchy Process
b) Decision Making under Risk and Uncertainty

6. MARKOV PROCESSES AND MARKOV CHAINS   [4L]
a) State transition diagrams
b) Calculation of the state of the system at any time period
c) Calculation of the long-run system state (both for systems with and without absorbing states):
Fundamental Matrix and associated calculations.
Application models to be discussed in detail

7. QUEUEING MODELS   [3L]
a) M/M/1 Queues and applications
b) M/M/c and M/M/c/k Queues and their applications

8. SIMULATION MODELS (Use of package)   [4L]
a) Construction of Simulation Models
b) Generation of Random numbers from discrete distributions
Application models to be discussed in detail

Suggested Readings
Anderson, Sweeny and Williams - Quantitative Methods for Business (8th edition); Thomson learning
Hillier, F.S. and Lieberman, G.J. : Operations Research (8th edition), TMH
Kasana, H.S. & Kumar, K.D. - Introductory Operations Research; Springer
Render B, Stair R M Jr, Hanna M E : Quantitative Analysis for Management (9th edition); Pearson Education
Ross, Sheldon – Simulation; Elsevier
Taha, H.A. : Operations Research - An Introduction (8th edition), Prentice Hall/Pearson Education
Vohra, N. D. Quantitative Techniques for Management (3rd edition), TMH
Winston, Wayne L. – Operations Research: Applications and Algorithms (4th edition); Thomson Learning