

501. QUANTITATIVE TECHNIQUES FOR MANAGEMENT

Duration 2.5 Hrs Total Marks 90(Term End Examination 56 marks , 4 marks for Attendance; Internal Assessment 30 marks out of which 2 marks for Attendance

Total Lectures 65

Objective: *To acquaint students with the construction of mathematical models for managerial decision situations and to use computer software packages to obtain a solution wherever applicable. The emphasis is on understanding the concepts, formulation and interpretation.*

Unit I: Linear Programming: Formulation of L.P. Problems, Graphical Solutions (Special cases: Multiple optimal solution, infeasibility, unbounded solution); Simplex Methods (Special cases: Multiple optimal solution, infeasibility, degeneracy, unbounded solution) Big-M method and Two-phase method; Duality and Sensitivity (emphasis on formulation & economic interpretation); Formulation of Integer programming, Zero-one programming, Goal Programming.

Unit II: Elementary Transportation: Formulation of Transport Problem, Solution by N.W. Corner Rule, Least Cost method, Vogel's Approximation Method (VAM), Modified Distribution Method. (Special cases: Multiple Solutions, Maximization case, unbalanced case, prohibited routes) Elementary Assignment: Hungarian Method, (Special cases: Multiple Solutions, Maximization case, unbalanced case, Restrictions on assignment.)

Unit III: Network Analysis: Construction of the Network diagram, Critical Path- float and slack analysis (Total float, free float, independent float), PERT, Project Time Crashing

Unit IV: Decision Theory: Pay off Table, Opportunity Loss Table, Expected Monetary Value, Expected Opportunity Loss, Expected Value of Perfect Information and Sample Information Markov Chains: Predicting Future Market Shares, Equilibrium Conditions (Questions based on Markov analysis) Limiting probabilities, Chapman Kolmogrov equation. Introduction to Game Theory: Pay off Matrix- Two person Zero-Sum game, Pure strategy, Saddle point; Dominance Rule, Mixed strategy, Reduction of $m \times n$ game and solution of 2×2 , $2 \times S$, and $R \times 2$ cases by Graphical and Algebraic methods; Introduction to Simulation: Monte Carlo Simulation

UNIT V & UNIT VI (For Internal Assessment).

Tutorials

Analysis of case studies based on syllabi of Unit I to Unit IV/ Assignments based on field survey/subject tours wherever feasible/Quiz programmes/moot courts wherever feasible/class presentations/class room seminars/Group discussions

Readings:

1. N. D. Vohra: Quantitative Management, Tata McGraw Hill .
2. P. K. Gupta, Man Mohan, KantiSwarup: Operations Research, Sultan Chand.
3. V. K. Kapoor: Operations Research, Sultan Chand & Sons.
4. J. K. Sharma: Operations Research Theory & Applications, Macmillan India Limited.