

# UNDERGRADUATE PROGRAMME IN BACHELOR OF MANAGEMENT STUDIES

## PAPER No. 7 OPERATIONS RESEARCH

**Learning Objective:** To acquaint students with the construction of optimization techniques and models for managerial decision situations. The emphasis is on understanding the concepts formulation and interpretation.

**Course contents:**

**Unit I**

**Lectures: 18**

Linear Programming: Formulation, Assumptions, and Solution: Graphical Solutions, Simplex Method, Artificial variable techniques (Big-M method and Two-phase method)  
Duality, Sensitivity: Resource and Cost.

**Unit II**

**Lectures: 17**

Integer programming: Formulation & solution through Gomory Cut method  
Transportation Problem: Formulation, Initial basic feasible solution by North-West Corner Rule, Least Cost method, Vogel's Approximation Method (VAM), Transportation Simplex Algorithm. Assignment Problem: Hungarian Method.

**Unit III**

**Lectures: 10**

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

**Unit IV**

**Lectures: 5**

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  $2 \times 2$ ,  $2 \times s$ , and  $r \times 2$  cases by Graphical and Algebraic methods and formulation to Linear Programming Problem (LPP).

**Unit V**

**Lectures: 6**

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. Limiting probabilities, Chapman Kolmogorov equation.

**Text Books:**

1. Hamdy A. Taha (2007). *Operations Research-An Introduction* (9th ed.). Prentice Hall.
2. J.K Sharma (2013). *Operations Research : Theory and Applications* (5th ed.). India: Macmillan India Ltd.

**References:**

1. Kanti Swarup, P.K. Gupta and Man Mohan(2001). *Operations Research* (9th ed.). Sultan Chand & Sons.
2. N.D. Vohra (2006). *Quantitative Techniques in Management*. (3rd ed.). Tata McGraw Hill