APPLIED OPERATIONS RESEARCH
[BUSI1509] [LTP: 2 1 0]

COURSE OBJECTIVE:
Understand, formulate, and apply decision-making models under conditions of certainty, risk, and uncertainty.

UNIT I LINEAR PROGRAMMING (9)

Introduction to Operations Research: Models and applications in functional areas of management. Linear Programming: Formulation, Maximization & Minimization Cases, Graphical and Simplex (Primal, Penalty, and Dual Simplex methods. Applications of Sensitivity Analysis

UNIT II TRANSPORTATION AND ASSIGNMENT MODELS (9)
Transportation Models (Minimising and Maximising Problems) – Balanced and unbalanced Problems – Initial Basic feasible solution by N-W Corner Rule, Least cost and Vogel‟s Approximation Methods. Check for optimality. Solution by MODI / Stepping Stone method. Case of Degeneracy. Transhipment Models. Assignment Models (Minimising and Maximising Problems) – Balanced and Unbalanced Problems. Solution by Hungarian and Branch and Bound Algorithms. Travelling Salesman problem. Crew Assignment Models.

UNIT III GAME THEORY AND INTEGER PROGRAMMING (9)
Game Theory-Two-person Zero sum games-Saddle point, Dominance Rule, Convex Linear Combination (Averages), methods of matrices, graphical and LP solutions. Integer programming: Branch & Bound and Gomory's cutting plane algorithms for 2 variables and 2 and more variable cases

UNIT IV REPLACEMENT & NETWORKING MODELS (9)
Replacement Models - Individuals replacement Models (With and without time value of money) – Group Replacement Models. Networking – Programme Evaluation and Review Technique (PERT) and Critical Path Method (CPM) for Project Scheduling- Crashing – Resource allocation and Resource Scheduling.

UNIT V INVENTORY, SIMULATION & JOB SEQUENCING MODELS (9)
Deterministic Inventory Models – EOQ and EBQ Models (With and without shortages), Quantity Discount Models. Monte Carlo Simulation application in decisions. Job Sequencing algorithm

TOTAL : 45 PERIODS

COURSE OUTCOMES:

CO1: Formulate, relate and apply the linear programming techniques to decision making.

CO2: Solve, appraise and demonstrate an understanding of adopting transportation and assignment models for optimization.

CO3: Compare, evaluate and choose the appropriate decision strategies using game theory and using integer programming models

CO4: Recall, relate, analyse and predict the replacement period of large and small items and adapt PERT and CPM techniques in forecasting project durations and resources.

CO5: Demonstrate an understanding to solve and estimate the optimum inventory parameters, the Job Sequencing process and apply simulation to decision making

REFERENCES:

1. Paneerselvam R., Operations Research, Prentice Hall of India, Third Edition, 2023.

2. Hamdy A Taha, Operations Research – An Introduction to Analytics, Ai and Ml, Pearson India, 2022

3. Anderson, D.R., Sweeney, D.J., Williams, T.A., and Martin, K. An Introduction To Management Science: Quantitative Approach to Decision Making, 14th Edition Paperback – 1, Cengage Learning India Pvt. Ltd., 2019

4. Gupta P.K., Hira D.S. and Kamboj A., Introduction to Operations Research, S.Chand, 2014

5. Hiller, F., Liebmann, Nagand Basu, Introduction to Operations Research, 11th Edition Paperback, Tata McGraw-Hill Publishing Co. Ltd., 2021