

OPERATIONS RESEARCH

Course No: **MM24206DCE**

Total Credits: **04**

Semester: **M.A/M.Sc 2nd Semester**

Total Marks: **100**

Continuous Assessment: **Marks 20, Theory Marks: 80** Time Duration: **2½ Hrs Course**

Course objectives: To equip the student with methods and trends for taking management decisions and networking.

Course Outcomes: This will develop a solid understanding of optimization techniques and concepts, including linear and nonlinear programming, integer programming, and dynamic programming.

UNIT –I

Definition of operation research, main phases of OR study, linear programming problems (LPP), applications to industrial problems –optimal product links and activity levels, convex sets and convex functions, simplex method and extreme point theorems, Big M and Two phase methods of solving LPP.

UNIT -II

Revised simplex method, assignment problem, Hungarian method, transportation problem, and mathematical formulation of transportation problem, methods of solving (North-West Corner rule, Vogel's method and U.V. method), concept and applications of duality, formulation of dual problem, duality theorems (weak duality and strong duality theorems), dual simplex method, primal- dual relations, complementary slackness theorems and conditions.

UNIT –III

Sensitivity Analysis: changes in the coefficients of the objective function and right hand side constants of constraints, adding a new constraint and a new variable, Project management: PERT and CIM, probability of completing a project.

UNIT –IV

Game theory: Two person zero sum games, games with pure strategies, games with mixed strategies, Min. Max. principle, dominance rule, finding solution of 2×2 , $2 \times m$, $2 \times m$ games, equivalence between game theory and linear programming problem (LPP), simplex method for game problem.

Recommended Books:

1. C. W. Churchman, R. L. Ackoff and E. L. Arnoff, (1957) Introduction to Operation Research.
2. F. S. Hiller and G. J. Lieberman, Introduction to Operations Research (Sixth Edition), McGraw Hill International, Industries Series, 1995.
3. G. Hadley, Linear programming problem, Narosa publishing House, 1995.
4. S. I. Gauss , Linear Programming, Wiley Eastern.
5. Kanti Swarup, P. K. Gupta and M. M. Singh, Operation Research; Sultan Chand & Sons.