M.A/M.Sc Mathematics Semester 3rd

Effective from academic session 2011 $\longrightarrow$ **Repetition for 2012 with minor change**
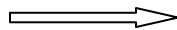
OPERATIONS RESEARCH

Course No. MM-OP-307

Unit I

Definition of Operational 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 x 2, 2 x m, 2 x m games. Equivalence between game theory and linear programming problem(LPP). Simplex method for game problem. Queues: Empirical models (M/ M/1): (GD/∞/∞) (M/M/C : (GD/∞/∞) model and (M/M/!): (GD/N/ ∞) model.

Recommended Books:

1. Curchman C.W Ackoff R.L and Arnoff E.L (1957) Introduction to Operations 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. Gauss S.I : Linear Programming : Wiley Eastern
5. Kanti Swarup, P.K Gupta and Singh M. M: Operation Research; Sultan Chand & Sons.

Suggested Readings:

1.Philips D.T., Ravindran A. and Solberg J. Operation Research, Principles and   Practice.

2.Taha H.A (1982) Operational Research : An Introduction; McMillan.

3.Curchman C.W Ackoff R.L and Arnoff E.L (1957), Introduction to Operations Research.
4.F. S Hiller and G.J. Lieberman: Introduction to Operations Research (SixthEdition) , McGraw Hill International, Industries Series, 1995.

5.G. Hadley : Linear programming problem, Narosa publishing House, 1995.

6.Kanti Swarup, P.K Gupta and Singh M. M: Operation Research; Sultan Chand & Sons.

7.S.S Roa : Optimization Theory and Application, Wiley Eastern Ltd. New Delhi.

8.Taha H.A, Operational Research, An Introduction; Macmillan(1995).