

**ME-404B****OPERATIONS RESEARCH  
( OPEN ELECTIVE )****L T P C  
4 - - 3****COURSE OBJECTIVES:**

1. To understand the methodology of OR problem solving and formulate linear programming problem.
2. To develop formulation skills in transportation models and finding solutions
3. To understand the basics in the field of game theory and assignment problems
4. To know how project management techniques help in planning and scheduling a project
5. To know the basics of dynamic programming and simulation.

**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. recognize the importance and value of Operations Research and linear programming in solving practical problems in industry
2. Interpret the transportation models' solutions and infer solutions to the real-world problems.
3. recognize and solve game theory and assignment problems.
4. gain knowledge of drawing project networks for quantitative analysis of projects
5. know when simulation and dynamic programming can be applied in real world problems.

**UNIT I****(12)**

**Linear Programming** : Definition and Scope of Operations Research, Mathematical formulation of the problem, graphical method, Simplex method, artificial basis technique, dual Simplex method. Degeneracy, alternative optima, unbounded solution, infeasible solution.

**UNIT II****(12)**

**Transportation Problem** : Introduction to the problem, LP formulation of a transportation problem. Basic feasible solution by north-west corner method, Vogel's approximation method, least cost method. Finding optimal solution by MODI method, degeneracy, unbalanced transportation problem and Maximization in transportation model.

**UNIT III****(12)**

**Assignment Problem** : One to one assignment problem, optimal solutions, unbalanced assignment matrix, travelling sales man problem, maximization in A.P.

**Theory of Games** : Introduction, rectangular two person zero sum games, solution of rectangular games in terms of mixed strategies, solution of 2x2 games without saddle point, concept of dominance to reduce the given matrix, Graphical method for 2xn and nx2 games.

**UNIT IV****(12)**

**Project Planning through Networks** : Introduction, Basic steps in PERT/CPM techniques, Network diagram representation, Rules of drawing network diagram, Fulkerson's rule, Time estimates and Critical path in network analysis, floats, Project evaluation and review technique, Application areas of PERT/CPM techniques.

**UNIT V****(12)**

**Dynamic Programming** : Introduction, Characteristics of D.P. model, the recursive equation approach, Computational Procedure in dynamic Programming, solution of an L.P. by D.P.

**Simulation** : Introduction, Monte-Carlo Simulation, Application to Inventory Control, Application to Queuing Problems.

## **LEARNING RESOURCES:**

### **TEXT BOOK(s):**

1. Operations Research - S.D.Sharma, Kedar nath Ram nath & Co, 2008.
2. Operations Research - Theory and Applications, J.K Sharma, Macmillan Publications India Ltd, 2013

### **REFERENCE BOOK(s):**

1. Operations Research - H.A.Taha, Pearson, 7th Edition, June 2002.
2. Introduction to Operations Research - Hiller and Liberman, MGH, 7th Edition, 2002.

### **WEB RESOURCES:**

1. <http://www2.informs.org/Resources/>
2. <http://www.mit.edu/~orc/>
3. <http://www.ieor.columbia.edu/>
4. <http://www.universalteacherpublications.com/univ/ebooks/or/Ch1/origin.htm>