

ALLIED COURSE- II
NETWORK MODELS & PROJECT SCHEDULING

Network optimization models: Introduction to network models, Transportation problem: formulation of transportation problem as a linear programming problem, methods to find initial basic feasible solution and optimal solution, Assignment problem: formulation of assignment problem as a linear programming problem, Hungarian method, Shortest path problem: formulation of shortest path problem as a linear programming problem, Dijkstra's algorithm, Travelling salesman problem: Branch and Bound solution algorithm.

Project Scheduling: Basics of project scheduling, network representation of project, critical path computation, probability and cost consideration in project scheduling: PERT calculations and crashing.

WEEK – WISE LAYOUT

Network optimization models: Introduction to network models.

[2]: Chapter 9: Pages 358-363

Transportation problem: formulation of transportation problem as a linear programming problem, methods to find initial basic feasible solution and optimal solution.

[1]: Chapter 5: Pages 193-197, 206-215

Assignment problem: formulation of assignment problem as a linear programming problem, Hungarian method.

[1]: Chapter 5: Pages 221-225, 228-229

Shortest path problem: formulation of shortest path problem as a linear programming problem, Dijkstra's algorithm.

[1]: Chapter 6: Pages 243-246, 248-250, 257-258

Travelling salesman problem: Branch and Bound solution algorithm.

[1]: Chapter 9: Pages 385-387, 392-394

Project Scheduling: Basics of project scheduling, gantt chart, network representation of project.

[2]: Chapter 9: Pages 399-403, [1]: Chapter 6: Pages 277-279

Critical path computation, probability and cost consideration in project scheduling:
PERT calculations and crashing.

[1]: Chapter 6: Pages 282-288, 293-295

[2]: Chapter 9: Pages 403-410

Text Book Readings:

1. **Hamdy A. Taha**, Operations Research: An Introduction, 8th Edition, Prentice Hall, 2008.
2. **Frederick Hillier and Gerald Lieberman**, Introduction to Operations Research. 9th Edition, McGraw-Hill Professional, 2010.

Additional Readings:

1. **Ravindran, Don T. Phillips, James J. Solberg**: Operations Research Principles and Practice, John Wiley & Sons, 2005
2. **Wayne L. Winston**, Operations Research: Applications and Algorithms, 4th Edition, Duxbury Press, 2003.
3. **Ferdinand K. Levy, Jerome D. Wiest**, A Management Guide to PERT/CPM, 2nd Edition, 1977, Prentice Hall.

LIST OF PRACTICALS

1. Solution of Transportation Problem as a LPP.
2. Solution of Assignment Problem as a LPP.
3. Solution of Travelling Salesman Problem.
4. Solution of Shortest Path Problem as a LPP.
5. Project planning (Deterministic case-CPM).
6. Project planning (Probabilistic case-PERT).
7. Crashing of the Project.

NOTE: Practicals are to be performed using software: MS Project, Excel-solver, LINDO, LINGO and Mathematica, TORA, etc.