

Course Name:
Operations Research in Transportation

Course Number:
20308

Credit:
4

Course Content (outline):

1. Modeling
 - Overview, Model Classification, Formulation of Linear Programming, Classification of Mathematical Programming Models
2. Linear Programming
 - Simplex Method, Linear Programs with Bounded Variables, Linear Programming in Matrix Form, Revised Simplex Method
3. Sensitivity Analysis
 - Shadow Prices, Reduced Costs, Variations in Objective Coefficients and Righthand-Side Values, Simultaneous Variations Within the Ranges, Parametric Programming
4. Duality
 - Definition of the Dual Problem, Duality Properties, The Dual and Primal-Dual Simplex Method, Duality in Mathematical Economics, Application of Duality in Game Theory
5. Networks
 - General Network-Flow Problem, Special Network Models, Simplex Method for Networks, Special Methods for Solving Network Problem
6. Integer Programming
 - Integer-Programming Models, Formulating Integer Programs, Sample Problems, Branch-and-Bound Procedure, Cutting Planes Procedure
7. Large-Scale Systems
 - Large-Scale Problems, Decomposition Method, Column Generation Method
8. Practical Applications of Mathematical Programming
 - Example of Problems

References:

1. Bradley, Hax & Magnanti, Applied Mathematical Programming.
2. Wagner, Principles of Operations Research.
3. Dantzig, Linear Programming & Extensions.
4. Luenberger, Introduction to Linear & Nonlinear Programming.
5. Lasdon, Optimally Theory for Large Systems.
6. Ford & Fulkerson, Flows in Network.
7. Dorfman, Samuelson, Solow, Linear Programming & Economic Analysis.
8. Hadley, Linear Programming.