CS 5400: OPTIMIZATION TECHNIQUES

Semester Hours: 3.0  
Contact Hours: 3

Coordinator: Robert Green

Text:  
Introduction to Mathematical Programming

Author(s): W. WINSTON AND M. VENKATARAMANAN

Year: 2002

SPECIFIC COURSE INFORMATION

Catalog Description:
Linear programming, game theory, PERT, network analysis; duality theory and sensitivity analysis; applications. Computer programs written to implement several techniques. Prerequisites: CS 1010 or CS 2010 and either MATH2220 or MATH 3220.

Course type: ELECTIVE

SPECIFIC COURSE GOALS

• I can Understand and Explain the Simplex Method
• I can Perform sensitivity analysis on various optimization problems
• I can Formulate and solve various optimization problems
• I can Implement and apply evolutionary and heuristic techniques

LIST OF TOPICS COVERED

• Linear Programming Problem Formulations
  o Blending, Diet, Multiperiod, Work Scheduling, Project Scheduling, and Financial Optimization Problems
• Solving Linear Programs
  o Python
  o Gurobi
• Simplex Algorithm
o Basic and non-basic variables
o Multiple Optimal Solutions
o Unbounded Linear Programs
o Degeneracy
o Big-M Method
o Two-Phase Simplex Method
o Unrestricted Variables

- Sensitivity Analysis
- Duality Theory
- Metaheuristic Algorithms