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. Prerequisite: Full Admission to MS in CS program or consent of department.

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.
- I can analyze relevant research and communicate my findings.

LIST OF TOPICS COVERED

- Linear Programming Problem Formulations
  - Blending, Diet, Multiperiod, Work Scheduling, Project Scheduling, and Financial Optimization Problems
- Solving Linear Programs
  - Python
• 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