

CS 4400 : OPTIMIZATION TECHNIQUES

<i>Semester Hours:</i>	3.0	<i>Contact Hours:</i> 3
<i>Coordinator:</i>	Robert Green	
<i>Text:</i>	Introduction to Mathematical Programming	
<i>Author(s):</i>	W. WINSTON AND M. VENKATARAMANAN	
<i>Year:</i>	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 MATH 2220 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
 - Blending, Diet, Multiperiod, Work Scheduling, Project Scheduling, and Financial Optimization Problems
- Solving Linear Programs
 - Python
 - Gurobi
- Simplex Algorithm
 - Basic and non-basic variables

- Multiple Optimal Solutions
- Unbounded Linear Programs
- Degeneracy
- Big-M Method
- Two-Phase Simplex Method
- Unrestricted Variables
- Sensitivity Analysis
- Duality Theory
- Metaheuristic Algorithms