

## **INSY 3410: Deterministic Operations Research**

### **3 Credit Hours**

**Instructor:** Erin Garcia

**Course Textbook:** Ross, S., Introduction to Probability Models, 12th Edition. Academic Press.

- Reference Books-
  - Hillier and Lieberman, Introduction to Operations Research, McGraw Hill, 8th edition
  - W.L. Winston, Operations Research: Applications and Algorithms, 4th edition

### **Course Content:**

- Description- Formulation, solution, interpretation, and implementation of mathematical models in operations research including linear programming, nonlinear programming, integer programming and network flows
- Prerequisite- ENG 1110 or 1113, MATH 2660
- Corequisite- INSY 3010
- Class is Required

### **Course Goals:**

- Objectives: By the end of the semester, each student will be able to: break down word problems into their component parts, build linear programs using specific problem data and using general form mathematical notation, model logic constraints in mathematical models using binary variables, read and execute an algorithm given in pseudocode, recognize, formulate, and solve network flow problems, understand and execute (by hand) the simplex algorithm, and solve linear programs using the gurobipy package in python and the excel solver.

### **Topics to be Covered:**

Modeling Deterministic Optimization Problems

Integer Programming (Modeling, Branch-and-Bound)

Linear Programming (Modeling, Simplex Method)

Heuristics (Simulated Annealing, Tabu Search)

Network Flows (Shortest Path, Max Flow, Transportation, Transshipment, Assignment)

Nonlinear Programming