

Simulation & Optimization

MSBR 70230

Office: 337 Mendoza

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Office Hours

Monday through Thursday: 10:00 to 12:00

Most Fridays: 10:00 to 2:00

Class Days and Time

Monday and Wednesday: Stayer B003

- Section 1: 1:00 - 2:50
- Section 2: 3:00 - 4:50

Course Objectives

By the end of the course, you will be able to:

- Identify problems that can be solved using advanced quantitative techniques, like linear programming and simulation.
- Translate word-based optimization problems into mathematical expressions.
- Understand the link between optimization, statistics, and machine learning.
- Know when to apply specific types of optimization to various problems.
- Recognize how statistical distributions can be related to real-life situations.
- Program simulations using programming languages of your choice.
- Identify key concepts related to linear process flows.

Course Activities

Readings

There is no *official* textbook for this course. There will, however, be readings posted for each topic. You are not committed to the readings, but they will certainly provide an expanded understanding of the content. All readings will be from free resources.

Class Flow

You will have time to review the course notes days before class, so come ready to discuss the material and ask any questions that you might have. We will use our class time to *extend, discuss, and practice*. We will use a variety of different techniques to share our ideas with each other and the class as a whole.

Class Exercises

Each day, you will be given the opportunity to practice problems related to the material. Although these exercises will not be “graded”, you will submit whatever you did for the day before the end of class. Engaging in class is the best way to learn the material!

Homework

There will be three assignments which will be graded; these assignments will come from the major topics within our class. The assignments and suggested due dates will be announced during the class. Each person should turn in their own assignment, but you are absolutely free to collaborate with people in class. Collaboration does not mean copying – it means that you have worked together to solve the problem and both people have their own unique answers to the problem. It is advised to start the assignments early and bring questions to office hours.

Homework assignments are broken down into three tiers – bronze, silver, and gold – and the difficulty scales with each. Grading for each assignment will be done in waves. After submitting your assignment, we will have a short meeting about your assignment, and you can correct anything that you need to correct.

Presentation/Project

The final for this class will be a group presentation (and accompanying write-up). You will be graded on the in-class presentation, the write-up, and peer evaluations.

Grading

Daily work – 100 points

Homework – 90 points

Final Presentation – 100 points

Total – 290 points

Schedule

Table 1: Tentative Schedule

	Week	Date	Topic	Assignments
1	1	08/23 (M)	Iteration	
2		08/25 (W)	R Markdown	
3	2	08/30 (M)	Linear Programming 1	
4		09/01 (W)	Linear Programming 2	HW1
5	3	09/06 (M)	Integer Programming 1	
6		09/08 (W)	Integer Programming 2	
7	4	09/13 (M)	Nonlinear Programming	HW2
8		09/15 (W)	Monte Carlo Simulation 1	
9	5	09/20 (M)	Monte Carlo Simulation 2	
10		09/22 (W)	Process Simulation	HW3
11	6	09/27 (M)	Process Simulation	
12		09/29 (W)	Project Day	
13	7	10/04 (M)	Project Day	
14		10/07 (Tr)	Presentations	