IEOR4101 Section 001 Fall 2025 Probability, Statistics and Simulation

Instructor
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Lectures
Time: Tue, Thu 2:40-3:55pm
Location: MAT 203

Prerequisites: Understanding of single and multivariable calculus.

Textbook
There is no required textbook. A recommended reference is *Introduction to Probability and Statistics for Engineers and Scientists* (5th edition) by Sheldon M. Ross, Elsevier.

Course Summary
Decision making in an uncertain environment is one of the most fundamental tasks in modern management sciences. Imagine yourself as an online retail manager who needs to decide how to stock up at various distribution centers, or as a management consultant who helps a manufacturing firm decide how much to invest in a new plant capacity. In instances like these, you need to make decisions based on a combination of data analysis, probabilistic reasoning, and the use of scientific computation. This course equips students with basic knowledge in these related areas.

Topics covered
- Probability: Sample space, counting rules, independence, conditional probability and Bayes' rule, discrete and continuous distributions, expectation and variance, joint and conditional distributions, covariance and correlation, law of large numbers, central limit theorem
- Simulation: Basic concepts on random number generation, inverse transform, acceptance-rejection sampling
- Statistics: Point and interval estimation, hypothesis testing, regression (if time permits)

Grading
Homework (20%)
Midterm (40%)

Final (40%)

Course Components

Homework:

- Weekly, usually due on Friday midnight.
- Homework is submitted online. You can either handwrite and scan, or type as word or pdf file, and upload to canvas.
- No late assignment is accepted. The two lowest scored assignments will be dropped from calculation in the final grade.
- Discussion among students on the assignments is allowed. However, every student should complete the assignments on his/her own.

Midterm and Final:

- The midterm exam will be held on Oct 16 (Thursday) during lecture.
- The final exam will be held on Dec 4 (Thursday) during lecture. The final is non-cumulative and covers only materials taught after the midterm.