ORIE 6580 Simulation
Fall 2010, syllabus updated 8/25/2010

Course Goals
Discrete-event simulation is one of the most widely used management science tools today with applications in, for example, manufacturing, finance, and telecommunications. Its popularity stems from its versatility and power. The objectives of this course are
- To impart skills useful in a variety of simulation-related contexts,
- To provide a survey of simulation theory, and
- To give an idea of selected research topics in simulation.

Lecturer
Peter Frazier
Office hours usually MW 4-5pm, Rhodes 232, check Blackboard for updates.

Assessment
There will be approximately 5 homeworks, a computer assignment, and a final exam. Homeworks are worth a total of 30% with the lowest grade dropped. The computer assignment (done individually) is worth 30%, and the exam is worth 40%.

Prerequisites
- Familiarity with basic probability, statistics and stochastic processes at, or close to, the level of ORIE 6500.
- A previous course in simulation (e.g., ORIE 5580) is not required, nor expected.
- Some programming experience. Students will be required to write small computer programs for the homeworks, and complete a larger program for the computer assignment. No assistance in programming will be given. You should be familiar with, and have access to, a high-level programming language such as Matlab, C, C++, Java, R, etc.

Textbook

Blackboard
Please sign up for the class webpage. Make sure it is ORIE 6580 you sign up for, as there are other similar websites for ORIE 5580, 5581 and 5582.

Course Content
We will cover the following topics (not necessarily in this order), with more depth in some than others.
- Overview of simulation: when it is needed, advantages/disadvantages
- Generating uniform pseudo-random numbers
- Generating non-uniform random variates
- Generating random vectors
- Generating stochastic processes
- Monte Carlo Integration
- Efficiency improvement (variance reduction) techniques
- Output analysis for finite and infinite-horizon simulation
- Optimization
- Other topics as time/interest allow, e.g., option pricing