

## Syllabus

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**Course description** In this course, we will study the use of simulation as a decision-making tool, including explorations into what simulation is, how to use it, and when its use is appropriate. These topics will be studied using SimPy, a discrete-event simulation language based on Python.

### Schedule

This schedule is subject to change.

Date	Topic
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#### Overview

8/21	Introduction to simulation, performance measures
8/26	Introduction to Python and IPython Notebook
8/28	Introduction to SimPy: event-driven vs. process-oriented simulation
9/2	SimPy: monitors, multiple servers
9/4	Replicating simulations: sample mean and variance, confidence intervals
9/9	Comparing alternate systems: two-sample t-test for equal means, Levene test for equal variances
9/11	SimPy: multiple queues, multiple arrival streams
9/16	Input data analysis: chi-squared goodness-of-fit test
9/18	Input data analysis: Kolmogorov-Smirnov goodness-of-fit test, testing for independence
9/23	Review
9/25	<b>Exam 1</b>

#### Under the hood: simulation theory, advanced SimPy constructs

9/30	Random number generation: linear congruential method, testing for uniformity with goodness-of-fit tests
10/2	Random variate generation: inverse transform method
10/7	Variance reduction: common random numbers
10/9	Variance reduction: antithetic variates
10/14	SimPy: balking, reneging, queue capacity
10/16	SimPy: user-defined distributions
10/21	SimPy: priority queues and preemptions, multiple arrival streams
10/23	Steady state simulations
10/28	Review
10/30	<b>Exam 2</b>

Date Topic

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11/4 SimPy: networks of queues, Markov processes

11/6 SimPy: levels and stores, newsvendor/inventory problems

**Putting it all together: project**

11/11 Holiday: Veterans Day

11/13 Work on projects

11/18 Work on projects, project model walkthroughs

11/20 Work on projects, project model walkthroughs

11/25 Work on projects

11/27 Holiday: Thanksgiving

12/2 Project presentations

12/4 Project presentations