

**Northeastern University**  
**IE 7215 – Simulation Analysis**

<b>Instructor</b>	<b>E-mail</b>	<b>Office</b>	<b>Phone</b>	<b>Office hours</b>
Ayten Turkcan				

<b>Class Schedule</b>	<b>Location</b>
TBA	TBA

<b>Teaching Assistant</b>	<b>E-mail</b>	<b>Office</b>	<b>Phone</b>	<b>Office hours</b>
TBA				

**Text:** Lecture notes  
Simulation Modeling and Analysis, Law, 4th Edition, McGraw-Hill, 2007.  
Simulation with Arena, Kelton et al., 5th edition, McGraw-Hill, 2010.

**Course webpage:** Blackboard

**Course description (from catalog):**

Covers elementary queuing models, simulation and modeling, simulation model design, a survey of simulation languages with one language covered in detail, input data analysis and distribution fitting, model verification and validation, output analysis and transient/steady-state response, terminating/non-terminating systems, model experimentation and optimization, random number/random variate generation, and variance reduction techniques.

**Prerequisites:** IE 6200; engineering students only.

**Course Objectives:**

- Understand basic concepts involved in computer simulation of systems
- Learn and practice the overall process of building valid simulation models
- Learn how to build and run discrete event simulation models using a simulation modeling language
- Make valid decisions by designing simulation experiments, and analyzing the results of simulation outputs

**Grading:**

Homework	10%
Midterm 1	30%
Midterm 2	30%
Project	30%

All midterm exams are closed books and notes. Formula sheet will be provided. The use of electronic devices during exams is not allowed. Only a calculator can be used.

**Software:**

- Arena 14.0 Student Version: Available for personal download  
[http://www.arenasimulation.com/Arena\\_Home.aspx](http://www.arenasimulation.com/Arena_Home.aspx)
- Arena 14.0 Full Academic Version: Installed in Northeastern University COE laboratories
- Microsoft Excel

**Course Schedule:**

<b>Week</b>	<b>Topic</b>
1	Introduction to Systems, Modeling and Simulation
2	Discrete Event Simulation
3	Monte Carlo Simulation
4	Input data analysis
5	Input data analysis Arena: Basic process modules and data structures
6	Arena: Resource states, schedules and failures
7	Arena: Rejections, balking, variables, expressions, reneging, holding, batching, reading/writing data files
8	Arena: Animation, stations, transfers, transporters, conveyors
9	Verification and validation Output data analysis
10	Terminating systems Non-terminating systems
11	Comparison of alternative systems Arena: Output Analyzer, Process Analyzer
12	Variance reduction techniques
13	Experimental design and optimization
14	Open topics: System dynamics Open topics: Agent-based modeling