Course Syllabus
IEMS 435: Introduction to Stochastic Simulation
Winter 2013

Instructor: Prof. Barry L. Nelson, Tech C216, nelsonb@northwestern.edu,
www.iems.northwestern.edu/~nelsonb/

Description: An introduction to stochastic discrete-event simulation for graduate students. The course covers simulation modeling and programming in general-purpose languages (specifically VBA for Excel) and (briefly) in specialized simulation environments (Simio, @Risk). The probability foundations of stochastic simulation, and proper design and analysis of the simulation experiment, are emphasized. Applications are drawn from manufacturing, financial, logistics and service systems.

The course prepares students to solve problems using simulation, to employ simulation in their research and to use good simulation programming structure.

Text: B. L. Nelson. *Foundations and Methods of Stochastic Simulation: A First Course*,
© Springer-Verlag 2012. ← **Purchase in Tech C210**

Prerequisites: Probability and statistics at the level of IEMS 401; computer programming in some programming language (C, Java, VBA, Matlab, etc.); and graduate standing. The course does **not** assume students know VBA for Excel.

Grading:

Simulation projects: 40%
Homework: 30%
Final Examination: 30%

- **The simulation projects and all other homework are to be done <u>individually</u>.**
  - o Looking at another student's written or programming solutions or letting another student look at your written or programming solutions is a violation of academic integrity, not a permitted form of collaboration. If you have any doubts about what form of collaboration is permitted, ask the instructor.

- The final examination will be open book and notes, and will be given on the date scheduled by the university (Friday, March 22, 9—11 AM) unless we find an earlier date that works for everyone.

- *Project reports and homework that are sloppily done, even if correct, will not receive full credit.* Graduate students should develop the facility to be careful, correct and clear, which may require rewriting homework solutions once you have figured them out and revising programs even after they are running.

Course Schedule:

Week	Topic	Reading	Dates	Other
1	Discrete-event stochastic simulation basics	Nelson Chapters 1 & 2	1/7, 1/9	
2	Simulation examples	Nelson Chapter 3	1/14, 1/16	VBA lab
3	Simulation modeling & programming in VBASim	Nelson Chapter 4	1/23	MLK Holiday
4	Simulation modeling & programming in VBASim	Nelson Chapters 4	1/28, 1/30	
5	Simulation as a stochastic process	Nelson Chapters 5, 6.1 & 6.2	2/4, 2/6	
6	Simulation input	Nelson Chapter 6.1 & 6.2	2/11, 2/13	BestFit lab
7	Simulation input	Nelson Chapter 6.3.1, 6.4 & 6.5	2/18, 2/19	
8	Simulation output	Nelson Chapter 7	2/25, 2/27	
9	Design & analysis: sequential analysis & steady state	Nelson Chapter 8.1 & 8.2	3/4, 3/6	@Risk, Simio lab
10	Design & analysis: optimization via simulation, ranking & selection Simulation for research (reading only)	Nelson Chapter 8.3, 8.4.1 & 8.4.2 Nelson Chapter 9	3/11, 3/13	
	Final Examination	The final is open book and notes.	Fri 3/22 9-11 AM	

Book web site:

http://users.iems.northwestern.edu/~nelsonb/IEMS435/