CIS 445/545: Modeling and Simulation

Course Syllabus
May 5, 2008

Spring *2008:* MWF 10:00-10:50 am, 221 McKenzie Hall
Prerequisites: CIS 314 and 315 for undergraduates; CIS graduate standing for graduates..
Mailing alias: cis445@cs.uoregon.edu
Website is http://www.cs.uoregon.edu/classes/08S/cis445.
Instructor: Prof. Sarah Douglas, 343 Deschutes, 346-3974, email: douglas@cs.uoregon.edu.
Office hours are MWF 2:00-3:00 or by appointment.

***Description*:** This course is intended as an introduction to modeling and simulation. We will be discussing both the theory as well as the programming issues. Although we will briefly cover continuous models, most of our time will be spent on discrete event models with stochastic (probabilistic numerical) properties. Some time will be given to modeling and simulation as practiced in computer science: operating systems and computer architecture evaluation, algorithm case analysis, etc.

***Textbooks*:** The text is Law, *Modeling & Simulation*, Fourth edition.
***Supplementary Texts*:** Any good statistics book – look in the library.

Meeting	*Date*	*Topic*	*NOTES*
Week 1	3/31	Overview of Course Introduction: Motivation, Types of Simulation, Simulation Concepts (Chap. 1.1-1.2; 1.8)	Lecture 0 Lecture 1
	4/2	Steps in Simulation; Advantages & Disadvantages (Chap. 1.7, 1.9, & 5.1)	Lecture 2
	4/4	Discussion Exercise #1	Exercise #1 due
Week 2	4/7	Implementation of Discrete Event Systems: General Model of Control (Chap. 1.3-1.4, Appendix 1A)	Lecture 3
	4/9	Implementation of Discrete Event Systems: Running the Simulation (Chap. 2.1, 2.3, 2.4)	Lecture 4
	4/11	Discussion Exercise #2	Exercise #2 due
Week 3	4/14	Improving Performance with Advanced Data Structures (Chap. 2.2 & 2.8)	Lecture 5
	4/16	Review of Basic Statistical Concepts (Chap. 4)	Lecture 6
	4/18	Review of Basic Statistical Concepts (Chap. 4) continued	
Week 4	4/21	Selecting Input Probability Distributions (Chap. 6.1-6.2 & 6.4 - 6.7)	Lecture 7
	4/23	Selecting Input Probability Distributions	

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		(Chap. 6.1-6.2 & 6.4 - 6.7) continued	
	4/25	Discussion Exercise #3	Exercise #3 due
Week 5	4/28	Midterm	Midterm
	4/30	Random Event Generation: Types of Generators (Chap. 7.1-7.2, 7.4)	Lecture 8
	5/2	Random Event Generation: Types of Generators (Chap. 7.1-7.2, 7.4)	
Week 6	5/5	Random Event Generation: Types of Generators (Chap. 7.1-7.2, 7.4)	
	5/7	Discuss midterm-More on using the inverse transform	Midterm-answers
	5/9	Random Event Generation: Uniform & Other Distributions (Chap. 8.1, 8.3, 8.4)	Lecture 9
Week 7	5/12	Discussion Exercise #4	Exercise #4 due
	5/14	Output Analysis: Discrete Event Systems (Chap. Appendix 1.B.3, 9.1-9.5)	Lecture 10
	5/16	Output Analysis: Queueing Systems (Chap.Appendix 1.B.1-3)	Lecture 11
Week 8	5/19	Markov Models	Lecture 12
	5/21	Comparing Alternative Systems (Chap. 10.1, 10.2) Validation & Verification of Systems (Chap. 5.2-5.6)	Lecture 13 Lecture 14
	5/23	Simulation Languages and Hardware for Simulation (Chap. 3) Case Studies (Chap. 2.6-2.7)	Lecture 15 & 16
Week 9	5/26	NO CLASS: Memorial Day holiday	
	5/28	Discussion Exercise #5	Exercise #5 due
	5/30	Parallel & Distributed Discrete Event Systems (Chap.1.6)	Lecture 17
Week 10	6/2	Future Trends in Modeling & Simulation: Chaos Theory	movie
	6/4	More on Chaos Theory	Lecture 18
	6/6	Review course and wrap-up	
Week 11	6/10	Final Exam 10:15am (2 hour exam)	

Final Exam (25%). There will be a final exam.

Midterm Exam (25%): There will be one midterm.

Homework (50%): Assignments to be done individually. Some assignments involve C programming. All programs should adhere to high-quality programming standards. i.e. well-structured and well-documented. Part of the grade will assess this quality. If you cannot get your program to run perfectly, please turn it in for partial credit.

Policy on Graduate Student Grading: Since this is a combined undergraduate/graduate class, I will grade graduate students differently in several ways. Graduate students will often have different problems to do, and, secondly, graduate student answers on problems will be held to higher expectations of quality. Graduate students will also be expected to make an in-class presentation on their final paper/project.

Policy on Late Assignments: All assignments are due at 10am at the beginning of class on the date due. Since we will discuss the assignments at that time, you must be present in class to receive credit. Late assignments will not be accepted. If you think you have a legitimate reason to argue for an exception from this rule, make sure that you communicate it *prior* to the due date.

Policy on Cheating and Plagiarism: Assignments constitute a large part of evaluation, hence it is crucial that they reflect your individual and group work. Any traces of plagiarism, i.e. copying someone else's work, will be dealt with according to the University regulations. On the other hand, I encourage you to share ideas and discuss the material in the lectures and textbook with other members of the class.