

# Syllabus for “CIS 445/545: Modeling and Simulation”

We will do course lectures and office hours online via “Zoom” meetings, unless otherwise notified.

The URL for course lectures is as follows: <https://uoregon.zoom.us/j/647840844>

The URL for office hours is as follows: <https://uoregon.zoom.us/j/450131531>

## 1. Course Information

- CRN: 31665 (CIS 445), 31676 (CIS 545)
- Prerequisites: CIS 315 Intermediate Algorithms, CIS 330 C/C++ and Unix
- Classroom: 254 STB
- Class time: 4:00 PM – 5:20 PM, Wed. & Fri., Spring 2020
- Instructor: Prof. Lei Jiao ([ljiao@cs.uoregon.edu](mailto:ljiao@cs.uoregon.edu))
- Office: 334 Deschutes Hall
- Office hour: 2:00 PM – 3:30 PM, Wed. Spring 2020
- Course webpage: Canvas

## 2. Course Description

This course provides the foundations of systems modeling and simulation techniques, with emphasis on discrete event system simulation. This course focuses more on computer science applications, despite the applications of system modeling and simulation exist in many fields as diverse as physics, chemistry, biology, economics, medicine, and engineering. This course introduces fundamental principles and concepts in the general area, including probability, queueing and input models, as well as a practical component, dealing with developing software capable of modeling and simulating a discrete system, and analyzing its results.

## 3. Course Materials

- Textbook: “Simulation Modeling and Analysis,” by Averill Law. ISBN-10: 0073401323; ISBN-13: 978-0073401324.
- A PDF version of the textbook is provided via Canvas.
- Slides and/or handouts will be provided via Canvas after each corresponding class.

## 4. (Tentative) Scheduling

LECTURE	TOPIC	TEXTBOOK
1	Definitions and Concepts for Modeling and Simulation	§1.1-1.2
2	Types of Models/Simulations, Process of Simulation, Advantages and Disadvantages	§1.7-1.8

3	Discrete Event Simulation	§1.3-1.4
4	Running Simulations	
5	Implementation of Discrete Event Systems: Data Structures	§2.1-2.2, 2.8
6	Review of Probability and Statistics for Simulation	§4
7	Selecting Input Probability Distributions	§6.1-6.2, 6.4-6.7
	Midterm exam	
8	Generating Random Numbers	§7-8
9	Output Analysis: Debugging, Central Limit Theorem, Warm-up and Steady-State	§9.1-9.5, 4.4
10	Building Valid, Credible, and Detailed Simulation Models	§5
11	Basics of Queueing System Models and Analysis	(course slides)
12	Basics of Markov Models and Analysis	(course slides)
	Final exam	

## 5. Grading Policy

- Homework (40%), Midterm exam (30%), and Final exam (30%).
- Homework: There are either 3 or 4 assignments, each of which must be done by each student individually. Some assignments involve writing and running C programs. 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 credits. All your solutions should be submitted via Canvas, unless specified in the assignments otherwise. Late submissions after the corresponding deadline will not be accepted. If you think you have a legitimate reason for being late, make sure that you communicate it to the instructor before the due date.
- Exams: No books/notes/materials permitted. Instructions will follow.

## 6. Communication Outside Classroom

- The instructor is willing and available to talk with students outside the classroom.
- If you e-mail about the class, make sure your e-mail subject begins with "CIS 445/545:".

## 7. Academic Dishonesty and Universal Learning Environment

For this course, all work must be done individually. You are encouraged to generally discuss problems with other students, but you may never use some other student's solution or codes in any way. The use of sources (ideas, quotations, paraphrases) must be properly acknowledged and documented. The student conduct code allows an instructor to impose an appropriate sanction for a student found guilty of academic dishonesty, up to and including an N or an F as the grade.

The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of instruction or design of this course that result in barriers to your participation. Students with a UO disability notification letter should please meet with me at their earliest convenience during the first two weeks of the term. You may also wish to contact Disability Services (<https://disability.uoregon.edu/>).