

CS 115 – Computer Simulation

Prof: Wayne Hayes (office: DBH4092), [whayes@ uci.edu](mailto:whayes@uci.edu)

Office Hours: To be negotiated, or by appointment (don't be shy)

Topics covered (subject to change with consent of professor + class):

discrete + continuous, dynamic + static, deterministic + stochastic simulation; modeling entities and relationships; basic probability and statistics for analyzing simulation output, eg., confidence intervals and hypothesis testing; random number generation + selecting input distributions; variance reduction techniques; specialized simulation languages.

Grading Scheme and Due Dates:

Note due dates are relative to the first lecture of the quarter, and may not correspond to official “Weeks” according to the Registrar. Eg if the first lecture of the quarter is a Thursday, then the 6th lecture occurs on a Tuesday 19 days later.

2 Programming Assignments Due: Start of 8 th and 12 th Class Lectures	20% each
Problem Set: Due Start of 14 th Lecture	10%
Midterm: In class during 16 th Lecture	10%
Simulation Project with write-up Due End of Exam Week Late assignments only accepted until End of Exam Week	40%

Suggested Texts:

Law + Kelton, *Simulation Modeling and Analysis*, 3rd Ed (cheap), or later editions (far more expensive) by Law alone. Others to be determined later.

Late Policy for assignments

- Assignments are due at the **START** of class
- must be submitted electronically **IN TWO DIFFERENT WAYS:** (1) on GradeScope.com, and (2) using the Unix command on openlab “/home/cs115/bin/submit”. (Run it with no options for help.)
- Late assignment date is judged by the LATER of the GradeScope and openlab submit dates.
- Excuses will be listened to. Good ones will be accepted.

Received

penalty (out of 100%)

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in class but after class starts	5%
up to 1 business day late	10%
up to 2 business days late	30%
More late than that	100% (don't bother)

Regrading requests

All requests for regrading must be submitted in writing with an explanation of why you think you should get more marks. Comparisons with the grades of other students in the class are allowed but in this case both assignments must be handed in for regrading. In any case, the entire assignment will be regraded; thus, you risk losing marks in other places where the grader may have been generous, even if your case has merit.

Academic dishonesty

Academic dishonesty will not be tolerated in any form. You may discuss ideas with your classmates (and others), but no written notes should be taken away from such discussions. All work you hand in must be your own. This course strictly adheres to all relevant University and ICS policies. It is each student's responsibility to be aware of these policies. To this end, all students are advised to (re)read the UCI Academic Senate Policy on Academic Honesty, noting in particular that any single incident of student academic dishonesty in this course is sufficient to merit a failing grade in the course with a letter of explanation being placed in the student's file. The Academic Honesty Policy for Information & Computer Science also applies to this course and deals explicitly with course work involving computers.

If you are unsure whether certain behavior is acceptable, ask before you engage in it.

Reading Material from *Simulation Modeling and Analysis*, 4th Edition

- Week 0: All readings listed on the course website (mostly introductory material)
- Chapter 1: Basic Simulation Modeling
 - o 1.1: Nature of Simulation
 - o 1.2: Systems, Models, and Simulation
 - o 1.3: Discrete-Event Simulation
 - o 1.4: Single-Server Queueing System
 - o 1.7: Steps in a Sound Simulation Study
 - o 1.8: Other Types of Simulation
 - o 1.9: Advantages, Disadvantages, and Pitfalls of Simulation
- Chapter 2: Modeling Complex Systems
 - o 2.1: Introduction
 - o 2.2: List Processing
 - o 2.3: A Simple Simulation Language: simlib
 - o 2.4: Single-Server Queueing System in simlib
- Chapter 3: Simulation Software
 - o 3.1: Introduction
 - o 3.2: Comparison of Simulation Packages with Programming Languages
 - o 3.3: Classification of Simulation Software
- All of Chapter 4: Review of Basic Probability and Statistics
- Chapter 5: Building Valid, Credible, Appropriately Detailed Simulation Models
 - o 5.1: Introduction & Definitions
 - o 5.2: Guidelines for determining level of model detail
 - o 5.3: Verification of Simulation Computer Programs
- Chapter 6: Selecting Input Probability Distributions:
 - o 6.1: Introduction
 - o 6.2: Useful Probability Distributions
 - o 6.4: Activity I: Hypothesizing Families of Distributions
 - o 6.5: Activity II: Estimation of Parameters
- Chapter 7: Random Number Generators sections:
 - o 7.1: Introduction
 - o 7.2: Linear Congruential Generators
- Chapter 8: Generating Random Variates
 - o 8.1: Introduction
 - o 8.2: General Approaches to Generating Random Variates
 - o 8.6: Generating Arrival Processes
- **UP TO HERE FOR THE MIDTERM**
- More Chapter 6:
 - o 6.6: Activity III: Determining Goodness-of-fit for Distributions
 - o 6.12: Models of Arrival Processes