CS 112: Computer System Modeling Fundamentals
Spring 2011

Course Overview

This course is designed to help students develop the mathematical reasoning skills necessary to solve problems that involve *uncertainty*. The foundational problem solving skills you will learn in this class are crucial for many exciting areas of computer science that inherently involve uncertainty, including artificial intelligence and machine learning, data mining, financial modeling, natural language processing, bioinformatics, web search, algorithm deign, cryptography, system design, network analysis, and more. These skills will also help you analyze the uncertainty in your day-to-day life.

The first half of the course will cover the basics of probability, including probabilistic models, conditional probability, discrete and continuous random variables, expectation, mean and variance, the Central Limit Theorem, and the Law of Large Numbers. The second half of the course will focus on Markov chains and statistical inference.

Statistics 100A or 110A is required for this course. Although we will review all of the basics of probability in class, we will go through some of this material very quickly. If you are not familiar with basic concepts like random variables and expectation, the first half of the course will be more challenging and require extra effort from you.

Meeting Times

Lectures: Tuesdays & Thursdays, 4:00-5:50pm, Kinsey Pavilion 1200B
Discussions: Fridays, 4:00-5:50pm, Kinsey Pavilion 1200B

Attendance at lectures is required, and there will occasionally be quizzes in class. Attendance at the discussion sections is **strongly encouraged** for students who wish to do well in the course.

Staff and Office Hours

Instructor: Prof. Jenn Wortman Vaughan
Office Hours: Wednesdays, 1:00-3:00, 4532H Boelter Hall
Contact: jenn at cs

TA: Ethan Schreiber
Office Hours: Mondays, 11:30-1:30, 2432 Boelter Hall
Contact: ethan at cs

Grader: Brian Geffon
Contact: briangeffon at gmail

Breakdown of Grades

Grades will be based on the following components:

- *Homework Assignments* (30%): There will be 5 homework assignments, typically due in class on Tuesdays. **No late homeworks will be accepted.** Most problems will be of the pencil-and-paper variety, though there will be a few small programming components too. For each

assignment, a subset of the problems will be graded in detail; you may or may not be told which problems will be graded in advance. Your solutions will be graded on both **correctness and clarity**. If you cannot solve a problem completely, you will get more partial credit if you identify the gaps in your argument than you will if you try to cover them up.

- *In-class Quizzes* (10%): Occasional quizzes will be given at the start of class. Missed quizzes cannot be made up, but your lowest quiz grade will be dropped.
- *Midterm* (30%): An in-class midterm will be given on Tuesday, May 3. The midterm will be closed book, but one page of double-sided hand-written notes is allowed. Calculators and cell phones may not be used during the exam.
- *Final Exam* (30%): A cumulative final exam will be held Thursday, June 09, 3:00-6:00pm. The same rules apply as for the midterm.

Textbook & Readings

The required textbook for this course is *Introduction to Probability* (2nd Edition) by Dimitri P. Bertsekas and John N. Tsitsiklis. We will cover Chapters 1–3, parts of Chapter 4, Chapter 5, and parts of Chapters 7–9. Every student must have access to a copy of this book.

Assigned readings will be posted on the course website throughout the quarter. To get the most out of class, you should complete the required reading **before** each lecture.

Regrade Policy

If you believe that a mistake was made in the grading of a homework assignment or exam, you may submit a request for a regrade. The request must be submitted in writing in the grader's dropbox in 2432 Boelter Hall, and must include a clear explanation of the reason you believe you should have received more points. No regrade requests will be accepted until 48 hours after the assignment or exam is returned, and all requests must be received within one week.

Academic Honesty Policy

Collaboration on the homework assignments is encouraged! Students are free to discuss the homework problems with anyone in the class under the following conditions:

1. Each student must write down his or her solutions independently, and must understand the solutions he or she writes down. Talking over solutions is fine, but reading or copying another student's answers is not acceptable!
2. Each student must write a list of all of his or her collaborators at the top of each assignment. This list should include **anyone with whom the assignment was discussed**.

Additionally, any sources used must be properly credited. These policies are described in more detail in the Academic Honesty Policy that must be signed by every student in the class.

Course Website

All of this information and more is available on the course website:

`http://www.cs.ucla.edu/~jenn/courses/S11.html`

Please check this website regularly for reading assignments, problem sets, and announcements.