CS 112: Modeling Uncertainty in Information Systems
Spring 2012

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, and the Law of Large Numbers. The second half of the course will focus on Markov chains and statistical inference. A detailed (tentative) schedule is available on the course website.

STAT 100A 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: Mondays & Wednesdays, 2:00–3:50pm, Boelter 2444
Discussion Section 1A: Fridays, 2:00–3:50pm, Boelter 2444
Discussion Section 1B: Fridays, 4:00–5:50pm, Boelter 5436

All students are **required** to attend lectures and the discussion section for which they registered.

Staff and Office Hours

Instructor: Prof. Jennifer Wortman Vaughan (jenn at cs)
Office Hours: Thursdays, 11am–noon, and by appointment, 4532H Boelter Hall

TA: Jacob Mathew (jacobgmathew at gmail)
Office Hours: Tuesdays, 11am–1pm, 2432 Boelter Hall

Graders: Ding Zhao (zhaoding at ucla) and Jake Stothard (stothardj at gmail)

Breakdown of Grades

Grades will be based on the following components:

- *Homework Assignments* (25%): There will be 5 homework assignments. **No late homeworks will be accepted.** Most problems will be of the pencil-and-paper variety, though there will be 2–3 C++ 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 Exercises* (15%): There will be frequent exercises given in lecture and discussion sections. Sometimes you will complete these exercises in groups, sometimes on your own. Exercises will be graded based on effort. It's ok to get the wrong answer if you show that you tried. Missed exercises cannot be made up, but your lowest exercise grade will be dropped.
- *Midterm* (30%): An in-class midterm will be given on Wednesday, May 2. 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 Tuesday, June 12, 11:30am–2:30pm. 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. 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. Additionally, you should email the grader once your request has been submitted. 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 as long as they follow the policies described in detail in the Academic Honesty Policy that must be signed by every student in the class.

Piazza Discussion Board

Rather than emailing questions to the staff, you are encouraged to post your questions on Piazza:

`http://www.piazza.com/ucla/spring2012/cs112`

For a list of examples of good uses of Piazza, check the course website. Remember that the course Academic Honesty Policy must be followed on Piazza and at all times.

Course Website

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

`http://www.cs.ucla.edu/~jenn/courses/S12.html`

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