AMS 131: Introduction to Probability Theory (Spring 2006)

General course information

Athanasios Kottas (Instructor) Matt Taddy (TA)
Office 153A Baskin Engineering 137 Baskin Engineering
E-mail thanos@ams.ucsc.edu taddy@ams.ucsc.edu
Phone 459-5536
Office hours* Mon 2-3pm, Wed 11am-12pm Thu 4-6pm

* The TA office hours will be held in 137 Baskin Engineering or in Jack’s Lounge (in the Baskin Engineering building).

Web page: http://www.soe.ucsc.edu/classes/ams131/Spring06/

Lectures: Tuesday, Thursday 12:00-1:45pm (Natural Sciences Annex 101)
Discussion sections:
Section 01A: Tuesday 6:00-7:10pm (Engineering 2 194)
Section 01B: Wednesday 5:00-6:10pm (Porter Acad 148)

Course description (from the registrar): Introduction to probability theory and its applications. Combinatorial analysis, axioms of probability and independence, random variables (discrete and continuous), joint probability distributions, properties of expectation, Central Limit Theorem, Law of Large Numbers, Markov chains. Students cannot receive credit for this course and Computer Engineering 107. (Formerly Engineering 131.)

Course objectives: To provide an introduction to the basic ideas of probability, distribution theory, and their applications. The main goal is to develop the basic mathematical tools to consider models that incorporate uncertainty using a probabilistic framework. We will begin by introducing the axioms of probability and the rules needed to perform calculations with probabilities. Next, we will move to the concepts of independence and conditional probability, discuss the Bayes theorem, define a random variable (both discrete and continuous), and consider its probability distribution function as well as its expectation and higher order moments. We will extend these ideas to the multivariate case. Moreover, we will consider some more advanced topics, such as the “Law of Large Numbers” and the “Central Limit theorem”. Finally, and as time permits, we will provide a brief introduction to certain classes of stochastic processes, including Markov chains and Poisson processes.

Background: This is a calculus-based course. Prerequisite(s) include Economics 11B or Mathematics 11B or Mathematics 19B.

Reading: The material in this course is cumulative and may go quickly. It is expected that you will stay up to date by reading the relevant textbook chapters and practicing with problems, including the homework problems. Note that, although attendance of the discussion sections is optional, it is strongly encouraged. The TA will discuss solutions to homework problems, work through additional examples that supplement the material covered in the lectures, and answer questions.

Homework: Homework will be assigned (typically, on a weekly basis), but will not be collected or graded. Answers to some of the textbook exercises are given at the back of the book. More detailed solutions will be given during the discussion sections and, for some problems, during the lectures. Working on the homework problems will enable you to develop facility in probabilistic thinking through regular practice. Moreover, it will provide early and regular feedback on your performance in the course through the solutions discussed during the sections, lectures, and office hours.

Quizzes: There will be four in-class short quizzes. Tentative dates for the quizzes are:

- Quiz 1: Thursday April 13
- Quiz 2: Thursday April 27
- Quiz 3: Thursday May 18
- Quiz 4: Thursday June 1

(If the date for a quiz is changed, it will be announced at least a week in advance of the new date.) In general, the problems for the quizzes will be based on the homework exercises. The lowest quiz score will be dropped when computing your average quiz score. This is meant to account for any reason that might prevent you from taking a particular quiz. Make-up quizzes will not be assigned.

Exams:

- Midterm exam: Tuesday May 9
- Final exam: Tuesday June 13, 12-3pm

Note that the final exam date and time is designated by the registrar. The midterm will be in-class. Both of the exams as well as the quizzes will be closed-book, but you may bring one (letter size) piece of paper with formulas on both sides. The final exam will be comprehensive.

Re-grade requests: We will consider re-grade requests for the midterm exam and the quizzes. In all cases, the request will be considered only within a week after returning the exam/quiz papers (except, of course, for outright grading mistakes, wrong addition of points etc.). You must provide your written request along with the exam/quiz paper.

Course grade: Quizzes: 30%, Midterm exam: 35%, Final exam: 35%