EECS126: Probability and Stochastic Processes
Fall 2005

Instructor: Anant Sahai. sahai@eecs. Office Hours in 258 Cory: Monday and Tuesday 2-3pm and by appointment.

GSI: Cheng Chang. cchang@eecs. Office Hours: TBA.

Lecture: TuTh 12:30-2pm in 247 Cory.

Discussions: Tuesday 4-5pm in 293 Cory, Thu 9-10AM in 241 Cory. You can attend either or both sections.

Text: *Introduction to Probability* by Bertsekas and Tsitsiklis. Available in campus bookstore.

You will be expected to do the reading on your own and **are strongly urged to try your hand at every single problem in the textbook.** Solutions to the book problems are available online.

Grading: HW (20%) Two Midterms (40%) Final Exam (40%). All exams are cumulative and any topics covered in readings, lecture, discussions, or homework to that point can show up on an exam.

Homeworks: Homeworks will show up on the class website and will be due every week at the beginning of Tuesday lecture. **Make a photocopy of your homework and turn in that copy.** Solutions will appear online shortly, and students are required to grade their own homework, and email the itemized grades to the TA before the next homework is due. **If you do not grade your own homework, we will assume that you want a zero for that assignment.**

Students are encouraged to collaborate on homework and groups of one to three students may identify themselves on on their homeworks, but need to write up their solutions individually.

Exams are not collaborative and cheating will not be tolerated as per the department's Academic Dishonesty Policy.

Midterms: Midterm 1: Thu Sep 29th, in class. Midterm 2: Thu Nov 10, in class. The preceding Tuesdays will be in-class review sessions. The discussion

section will cover some practice midterm questions. Both midterms are closed book with one sheet of notes permitted, that must be turned in with the exam.

Final: As per the exam schedule, Dec 19th 12:30pm at the TBA location. A review session will be scheduled. Open book, but no notes are permitted.

Prerequisites: EECS 20 (absolute must), and Math 53/54 or equivalent.

Other: EECS 126 at Berkeley is similar to the course 6.041 at MIT. The difference is that our 126 covers more material at a slightly more intense level than our MIT counterpart. Even so, you should find the MIT course website a useful resource for your studying.

This course will build on EECS 20 and will help give you the tools and understanding you will need to get to senior/grad level classes like 121, 226a, 224ab, etc. EECS 120 (Signals and Systems) is not required for this course and gives a complementary set of tools needed for advanced material, especially in the area of communications. In addition:

- We want you to master the material covered in this class and to get a good grade. We understand that different students have different ways of learning, and so extra credit can be made available for a range of activities: from "scribing" good lecture notes for sharing with the class (make them in LaTeX format with eps figures) to doing projects that demonstrate deeper understanding.
- To understand this material well, you have to work out problems and explore on your own. The assigned homework is the bare minimum — you should be working out book problems, trying to stump your classmates with puzzles, as well as playing with coins, cards, and dice. **You are strongly encouraged to form study groups for this course.**
- While helping your classmates learn the material and getting help from upperclassmen who have taken the class is a good idea, cheating on exams is dishonorable and will be severely punished.
- Give feedback to us if you have comments or questions.

- HKN is your friend. Take advantage of the free tutoring.

Course Outline: (This is the goal, although the schedule may be adjusted depending on class interest, performance, etc...)

Aug 30 Sep 1:	Administrivia and begin Chapter 1. Basics of probability and the concept of independence.
Sep 6, 8:	Chapter 1 continued: conditioning and counting. *These lectures will be given by the GSI.*
Sep 13, 15, 20:	Chapter 2: discrete random variables.
Sep 22:	Start Chapter 3: continuous random variables.
Sep 27, 29:	Review Session (*GSI*) and Midterm. The assigned homework this week is to do the midterm again at home.
Oct 4, 6, 11:	Continue Chapter 3. Extra emphasis (beyond the textbook) on mixed continuous and discrete random variables.
Oct 13:	Slack in case we are falling behind or can jump ahead.
Oct 18, 20, 25, 27:	Chapter 4. Additional material will be presented in class giving a geometric and linear algebra perspective on the bivariate normal distribution.
Nov 1, 3:	Chapter 5: Bernoulli and Poisson arrival processes.
Nov 8, 10:	Review Session (*GSI*) and Midterm. The assigned homework this week is to do the midterm again at home.
Nov 15:	Advanced topics from Chapter 5.
Nov 17, 22, 29:	Chapter 6: Markov Chains. Additional material will be presented in class giving linear algebra tools for understanding Markov chains.
Dec 1, 6, 8:	Chapter 7: Laws of large numbers and bounding probabilities.

The discussion sections each week will review background material and supplement lecture, but mostly will be showing how to solve problems that apply the material covered in lecture.