EECS 126: Probability and Random Processes
Fall 2006

Practical Information

Lectures: Tues/Thurs from 3:30–5 pm Location: 247 Cory Hall

Discussions: Monday, 4:00–5:00 pm, 293 Cory. Friday, 9:00–10:00 am, 531 Cory.

Course webpage: `http://inst.eecs.berkeley.edu/~ee126/`

Instructor

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Textbook: *Introduction to Probability*, by D. Bertsekas and J. Tsitsiklis. Available at the campus book store. In addition to attending lectures and discussions, doing problems and reading the textbook outside of class will be an integral part of the learning process.

Pre-requisites: EECS 20, and MATH 53/54 (multivariate calculus; linear algebra) or equivalent.

Grading: Homeworks (15%); Two midterms (20% each); and one final exam (45%). All exams are cumulative in nature, meaning that any topic covered in lecture, discussion or homework up to that date can be tested.

Homeworks: Problem sets will be posted on the class webpage (roughly one per week), and will be due on Fridays *before* 4pm in the EE 126 box in 240 Cory Hall (Student Lounge). Late homeworks *will not* be accepted. If they chose, after attempting the problems on an individual basis, students can discuss homework assignments in groups of at most three. However, each student must write up his/her own solutions individually, and must explicitly name any collaborators at the top of the homework.

Exams:

Midterm #1: Thurs. October 5
Midterm #2: Thurs. November 16.
Final Exam: Tues. Dec 19.

Note: All of the exams (both midterms, and final) are *strictly non-collaborative* in nature. Any form of cheating will not be tolerated as per this Department's Academic Dishonesty Policy; see `http://www.eecs.berkeley.edu/Policies/acad.dis.shtml`.

Course outline

This course is a 4-unit course that provides an introduction to the basics of probability and random processes. This material is central to many fields in electrical engineering and computer science, including statistical signal processing, communications, control theory, and networking. It builds on the foundation of EE 20, and provides necessary background for higher-level courses, work and research. The material in EE 120 is complementary to the material covered in this course.

- basics of probability (Chapter 1): sets, probabilistic models, sample spaces, conditioning, Bayes' rule, independence etc. (Time: approx. two weeks)
- discrete random variables (Chapter 2): definitions, examples, mass functions, expectation, mean, variance etc. (Time: approx. two weeks)
- general random variables (Chapter 3): continuous variables, density functions, conditioning, normal variables etc. (Time: approx. two weeks)
- further topics (Chapter 4): transforms, convolution, conditional expectation, least squares, bivariate normal (Time: approx. two to three weeks)
- Bernoulli and Poisson processes (Chapter 5): definitions, examples, properties (Time: approx. one to two weeks)
- Markov chains (Chapter 6): discrete time chains; classification; long-run behavior; absorption. (Time: approx. one to two weeks)
- Limits of random variables (Chapter 7): inequalities, law of large numbers, central limit theory (Time: approx. one to two weeks)

You should be aware that the material and learning process is cumulative in nature, in that later lectures will build upon the results of previous lectures and homeworks. For this reason, it is particularly important that you keep up with the class (i.e., by reviewing your lecture notes, doing the assigned reading, working on the homeworks etc.). Past experience shows that some hard work early on to learn the foundations well pays dividends later in the semester!