EECS 501
PROBABILITY AND RANDOM PROCESSES
Fall 1999

Synopsis

The goal of this course is to learn how to work with probabilistic models of random experiments. The course covers several ways of describing such experiments (probability spaces, random variables, random vectors and random processes) and several ways of describing their probability distribution (probability measures; distribution, mass and density functions). Much of the course is concerned with how to compute various probabilistic quantities (e.g. event probabilities, expected values, correlations, best estimates, frequency spectra) from other probabilistic quantities (e.g. density functions). The course topics are similar to those typically covered in a senior level course, but a deeper level of understanding is expected and more attention is paid to mathematical formulation.

Course Details

Room & Time: MWF 8:30-9:30, 1311 EECS Bldg.

Credit hours: 4

Prerequistie: EECS 401 or graduate standing

Recitations: One session 1 1/2 hrs per week. They are currently listed as
Mon 3:30-5, 3437 EECS; Tues 1:30-3, 1301 EECS, Wed 12:30-2, 3427 EECS.
However, as will be discussed in class, we are trying to reschedule them.

Instructor: Prof. David L. Neuhoff, 4215 EECS Bldg.
neuhoff@eecs.umich.edu, 764-6586
Office hours: MWF 9:30 to 10, T,Th 2-3
Or by appointment: stop by, call, or send email

Teaching Assistants:
Olgica Milenkovic: 764-5205, molgica@engin.umich.edu
Office hours: Wed. 3:30-5:30, Thurs. 12-2, Fri. 3:30-4:30.
Amir Ghanei: 763-4497, aghanei@engin.umich.edu
Office hours: Mon. 10-12, Fri. 11-1.
The TA's hold their office in the usual EECS TA office hour room: 2420 EECS..
You may also call or email them to see if they have time to meet you at some other time.

Office Hour Summary:
Mon.: 9:30-10, D. Neuhoff, 4215; 10-12, A. Ghanei, TA room
Tues.: 2-3, D. Neuhoff, 4215
Wed.: 9:30-10, D. Neuhoff, 4215; 3:30-5:30, O. Milenkovic, TA room
Thurs.: 12-2 O. Milenkovic, TA Room; 2-3, D. Neuhoff, 4215
Fri.: 9:30-10, D. Neuhoff, 4215; 11-1, A. Ghanei; 3:30-5:30 O. Milenkovic

Text : *Probability Random Processes and Estimation Theory for Engineers*,
by H. Stark and J. Woods.

References: Other textbooks at a similar level:
W. Davenport, *Probability and Random Processes*
R. Gray and L. Davisson, *Random Processes*
A. Papoulis, *Probability Random Variables and Stochastic Processes*,
S. Ross, *A First Course in Probability*
D. Sakrison, *Communication Theory* (Chapters 3 and 4)

Senior level textbooks:

A. Drake, *Fundamentals of Applied Probability*
C. Helstrom, *Probability and Stochastic Processes for Engineers*
A. Leon-Garcia, *Probability and Random Processes for Electrical Engineering*
P. Peebles, *Probablility, Random Variables and Random Signal Principles*.
R. Roberts, *An Introduction to Applied Probability*
J. Thomas, *Introduction to Probability*

Rough Syllabus: Probability models: Chapter 1 of Stark and Woods
Random Variables: Chapters 2-5, 7
Estimation/decision/prediction theory: A little of Chapter 6
Random processes: Chapters 8 and 10.

Homework: With a few exceptions, homework will be assigned every week. It is important, and it counts enough so you take it seriously, but not so much that you cannot afford to make mistakes. Usually, homework will be assigned Monday morning in class and will be due the following Monday at 3:30 PM. It can be turned in at lecture on Monday, or at the 3:30 Monday recitation just before it begins, or at Prof. Neuhoff's office (or alternative site posted on the door). It will typically be graded and returned one week later. Solutions will be made available. If you have questions about the grading, see Prof. Neuhoff or one of the TA's.

Late policy: 25 % off if received after the due date/time, but before start of next lecture. 50% off if received after that, but within one week of the due date/time, no credit if received after one week.

Notes: Homework must be turned in in one of the ways mentioned above. Do not leave it in a mailbox. Homework cannot be handed in while a lecture or recitation are under way. It must be turned in before the lecture or recitation starts to be counted as "before".

Collaboration policy: All homework assignments are to be completed on your own. You are allowed to consult with other students during the conceptualization of a solution, but all written work,whether in scrap or final form, is to be generated by you working alone. You are also not allowed to use, or in anyway derive advantage from, the existence of solutions prepared in prior years. Violation of this policy is an honor code violation. If you have any questions about this policy, please do not hesitate to contact me.

Exams: Two evening 2-hour midterms at dates to be announced.
Final Exam: Thurs. Dec. 16, 10:30-12:30.

Grade: Homework 15% (lowest homework grade will be dropped)
Midterm I 25%, Midterm II 25%, Final Exam 35%.

First reading assignment: Sections 1.1-1.4 of Stark and Woods, and Chapter 1 (except the marked parts) of Munkres, handed out in class.

E-mail announcements: Announcements (e.g. homework problem hints and corrections, exam schedules) will be emailed to the class. You must register for the class email list by sending email to eecs501-request@eecs.umich.edu with the word "subscribe" in the subject line. There will be one or more test emails that will announce in class. Let me know if you do not receive them.

Course web page: Under construction. Most handouts (such as homework and solutions) will be archived on the web page.