

EECS 401

Probabilistic Methods in Engineering

Winter 2000

Synopsis

The goal of this course is to learn how to work with probabilistic models of random experiments, principally those that arise in electrical engineering. The course covers several ways of describing such experiments (probability models, random variables, random vectors and random processes) and several ways of describing their probability distribution (probability 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).

Time & Room: MWF 9:30-10:30, 1311 EECS Bldg.

Instructor: Prof. David L. Neuhoff
4215 EECS Bldg.
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Teaching Assistant: Helen Tarn
htarn@engin.umich.edu, 763-4497

Office Hours: Monday -- 10:30-11 (or later if needed), Rm 4215, DN.
Tuesday -- 9:30-12:30, Rm 2420, HT.
2-3, Rm 4215, DN.
Wednesday -- 10:30-11 (or later if needed), Rm 4215, DN.
1:30-4:30, Rm 2420, HT
Thursday -- 9:30-12:30, Rm 2420, HT.
2-3, Rm 4215, DN.
Friday -- 10:30-11 (or later if needed), Rm 4215, DN.
Or by appointment, call or send email to DN or HT.

Text : *Probability and Random Processes for Electrical Engineering*, Alberto Leon-Garcia

The "Student Solution Manual" will be placed on reserve in the library. It has additional problems and their solutions.

There are other textbooks at a similar level that might be useful for providing an alternative explanation, or additional insight and exercises.

G. Cooper and C. McGillem, *Prrobabilisitic Methods of Signal and System Analysis*

A. Drake, *Fundamentals of Applied Probability*

*C. Helstrom, *Probability and Stochastic Processes for Engineers*

*P. Peebles, *Probablility, Random Variables and Random Signal Principles*.

*R. Roberts, *An Introduction to Applied Probability*

*S. Ross, *A First Course in Probability*

J. Thomas, *Introduction to Probability*

R. Ziemer, *Elements of engineering probability and statistics*

The following books are somewhat more advanced, i.e. at the 501 level:

W. Davenport, *Probability and Random Processes*

H. Stark and J. Wood, *Probability, Random Processes and Estimation for Engineers*.

Asterisked books will be placed on reserve in the Media Union. Let me know if there are others of these that you would like placed on reserve.

First reading assignment: Chapter 1. Chapter 2, Sections 2.1, 2.2

Syllabus: The course will by and large follow the flow of the Leon-Garcia text.
Introduction: Chapter 1
Basics of probability: Chapter 2
Random variables: Chapters 3, 4, 5 (skipping/skimming most starred sections)
Random processes: Chapter 6: 6.1-6.5, Chapter 7: 7.1, 7.2

Homework: Roughly every week. Usually assigned on Friday and due the next Friday. Graded papers and solutions will be returned approximately one week after due date. A first draft of the homework solutions will be posted on the web after the homework is due. It will be updated after the homework papers are graded and returned.

Collaboartion 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 midterms at dates to be announced. Probably in the evening.
Final Exam on Tues. April 25, 4-6 PM

Grade:

Homework	15%	(lowest homework grade will be dropped)
Midterm 1	25%	
Midterm 2	25%	
Final	35%	

email announcements: Many important announcements (e.g. homework problem hints and corrections, exam scheduling, changes to office hours etc.) will be emailed to the class. You must register for the class email list by sending email to eeecs401-request@eeecs.umich.edu with the word "subscribe" in the subject line. There will be one or more test emails, which will be announced in class. Let me know if you do not receive them.

Class web page: Currently under construction. It will be www.eecs.umich.edu/courses/eeecs401/w00
Most handouts (such as homework and solutions) and email announcements will be archived on the web page.