Math 170A: General Course Outline

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Catalog Description

170A. Probability Theory. (4) Lecture, three hours; discussion, one hour. Requisites: courses 32B. Not open to students with credit for Electrical Engineering 131A or Statistics 100A. Probability distributions, random variables and vectors, expectation. P/NP or letter grading.

Textbook

Sheldon Ross, 7th Ed.

Reviews & Exams

The following schedule is for 25 lectures. The remaining classroom meetings are for leeway and two midterm exams. For lectures marked with "*" see the comments below.

Schedule of Lectures

Lecture	Section	Topics & Example Numbers
.	.	**Combinatorics**
1	1.2	Basic principle of counting
2-3	1.3,1.4,1.6	Permutations, combinations, number of ways to distribute distinct and equal objects
.	.	**Probabilistic models**
4	2.2,2.3	Set theory, axioms of probability
5	2.4,2.6	Properties of probability laws
6*	2.5	Uniform distribution on a ?nite set
.	.	**Dependence and independence**
7-8	3.2,3.3,3.5	Conditional probabilities and Bayes' formula
9	3.4	Independence of events
10	4.1	Random variables: Basic de?nitions and examples
11	4.9	The cumulative distribution function and its properties
.	.	**Discrete random variables**
12-13	4.2-4.5	Discrete random variables: probability mass function, ex-pectation and variance
14-15	4.6,4.8.1	Bernoulli, binomial and geometric random variables
16	4.7	Poisson random variables
.	.	**Continuous random variables**
17-18	5.1,5.7	Continuous random variables: probability density, distribution of a function of a continuous random variable
19	5.2	Expectation and variance of a continuous random variable
20	5.3,5.5	Uniform and exponential random variables
21-22	5.4	Normal random variables, normal approximation

.	.	**Jointy Distributed Random Variables**
23	6.1	Joint distribution function
24	6.2	Independence of random variables
25*	6.7	Joint distribution of functions of random variables

Comments

To put an emphasis on the problem how to find probabilistic models, lecture 6 can be extended to 2 or 3 lectures, so that the continuous uniform distribution on a bounded set in 1 or 2 dimensions and sequential models also can be covered. A good source for that is Bertsekas/Tsitsiklis (Chapter1.2), see "http://www.athenasc.com/probbook.html".

If time is too short the easiest thing to do is to skip lecture 25.

Outline update: T. Richthammer, 8/08