

Math 170B: General Course Outline

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Catalog Description

170B. Probability Theory. (4) Lecture, three hours; discussion, one hour. Prerequisite: course 170A or Statistics 100A. Convergence in distribution, normal approximation, laws of large numbers, Poisson processes, random walks. P/NP or letter grading.

Textbook

Sheldon Ross, 7th Ed.

Reviews & Exams

The following schedule is for 26 lectures. The remaining class room meetings are for leeway and one or two midterm exams. For lectures marked with "*" see the comments below.

Schedule of Lectures

Lecture	Section	Topics and Example Numbers
.	.	Sums of random variables
1	6.1,6.2,6.7	Review of basics
2	6.3	Sum of independent random variables
3	7.2	Expectation of sums
4-5	7.4	Variance of sums, covariance and correlations
.	.	The use of indicators
6	7.3	Moments of the number of events that occur
7	1.5,6.1 (1f),7.4(4f)	Multinomial coefficients, multinomial random variables
8	4.8.3,7.2 (2g),7.3(3b)	Hypergeometric random variables
9	2.5(5m),3.5 (5d),7.2 (2h),7.3(3c)	The match problem.
.	.	Conditional distribution
10	6.4,6.5	Conditional distribution: discrete / continuous case
11-12	7.5	Conditional expectation and variance
.	.	Moment Generating Functions
13*	7.6	Conditional expectation and prediction
14-15	7.7	Moment generating and joint moment generating function
16	7.8.1	Multivariate normal distribution
17	7.8.2,7.3 (after 3b)	Sample mean and variance, chi-squared distribution
.	.	Limit theorems

18	8.2	Chebyshev's inequality, weak law of large numbers
19-20	8.3	Central limit theorem, normal approximation
21*	8.5	Other Inequalities
22*	8.6	Poisson approximation
.	.	Stochastic processes
23	9.1	The Poisson process
24-26*	3.4(4k)	Random walks: gambler's ruin problem, reflection principle, arcsine law, recurrence/transience, oscillations

Comments

Apart from the gambler's ruin problem, random walks are not covered in Ross. A possible source for additional material for lectures 24-26 is Stirzaker (5.6,6.8), or Feller.

If time is too short the easiest thing to do is to skip one or more of the lectures 13, 21, 22.

Outline update: T. Richthammer, 8/08

For more information, please contact Student Services, ugrad@math.ucla.edu.