

Probability

Math 1610

Fall 2009

Meets: MWF 11:00-11:50 in Barus & Holley 157

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Office hours: MW 1:00-2:00 & by appointment

Text: Charles M. Grinstead and J. Laurie Snell, *Introduction to Probability*, 2nd edition.
http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/amsbook.mac.pdf

Course overview: This is a course in basic probability intended for both majors and non-majors in mathematics. The only mathematical prerequisite is a reasonable knowledge of calculus (sequences and series through double integrals). Topics covered include: probability spaces (continuous and discrete), conditional probability (independence, Bayes' Formula), expected value, variance, the Law of Large Numbers and the Central Limit Theorem. The common probability distributions and densities will be examined in detail. Basic combinatorics (permutations, generating functions) will be treated when necessary. There will be a focus on examples from various scientific fields and games of chance. Additional topics (Markov chains, random walks) will be covered as time permits.

Weekly problem sets and other material will be available from the

Course website: <http://www.math.brown.edu/~wgillam/probability>

Grading: Grades will be based on homework (20%), two midterm exams (25% each), and a final exam (30%).

Tentative schedule:

Sept. 9	What is probability? History of probability.
Sept. 11	Discrete probability: sample spaces, discrete probability spaces, random variables.
Sept. 14,16,18	Continuous probability. Density functions.
Sept. 21,23,25	Expected value and variance of a random variable.
Sept. 28,30	Binomial coefficients. Conditional probability and Bayes' Formula.
Oct. 2	Examples. The pass line bet in craps.
Oct. 5,7	Uniform and binomial distributions.
Oct. 9	First Midterm Exam
Oct. 14,16	Geometric, negative binomial, and Poisson distributions.
Oct. 19,21,23	Continuous distributions: uniform, exponential, gamma.
Nov. 2,4,6	The beta distribution. Functions of random variables.
Nov. 9,11,13	Independent random variables. The Law of Large Numbers.
Nov. 16	Second Midterm Exam
Nov. 18,20	The Central Limit Theorem.
Nov. 30, Dec. 2,4	Generating functions. Random walks.
Dec. 7,9,11	Reading week. Final exam review. Additional topics.