

# MA/STAT 519. Introduction to Probability.

Fall 2003. Tu Th 9:00-10:15, UNIV 201

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Office hours: Tu Th 12:00 - 1:30 MATH 504, or by appointment.

**Required Textbook:** *Introduction to Probability Theory*, by Hoel, Port and Stone; Houghton Mifflin, ed.; 1971.

**Suggested additional reading:** *First Course in Probability, 6th edition (2001)*, by Sheldon Ross; Pearson Education, ed; ISBN 0130338516.

**Suggested future enrollment:** MA/STAT 532; MA/STAT 598F (MA 515); MA/STAT 598G (MA 516); MA/STAT 538.

**Prerequisite / Suggested preparation:** MA 510 (vector calculus); or **co-requisite** MA 440 or MA 341 (real analysis). A mathematical introduction to analysis at the upper division undergraduate level is what you need, including maturity in understanding and writing rigorous proofs. Familiarity with calculus is also a good preparation.

**Course description.** The topics in this course will closely follow those of the textbook, including sample spaces, combinatorial problems, independence, random variables, distribution functions, special continuous and discrete distributions, moment-generating functions, laws of large numbers and the central limit theorem, the Poisson process, random walks, and an introduction to Brownian motion<sup>1</sup>. Because more than half of the textbook is at a very basic level that many students will already be familiar with, the course will proceed quickly in the first five chapters, in order to devote more time to the latter chapters. In the lectures, as well in all class assignments, the emphasis will be on understanding the concepts thoroughly rather than knowing how to apply computational recipes.

## Performance Evaluation and Grading Scheme.

**Homework (10%).** Homework will be assigned no more often than once a week, but as often as once every two weeks. While it is acceptable to work in groups on homework problems, each student must turn in a separate assignment, and identical solutions are NOT acceptable. Your homework must reflect YOUR understanding of the material. Some of the homework problems, which are harder than others, will be provided with hints; they are designed to help you think about the subject in more than a routine calculatory way; you will learn a lot by doing them.

**Mid-term examinations (25 \* 2 = 50%).** There will be 2 in-class exams, each worth 25% of your grade, each 60 to 75 minutes in duration. The exact dates will be announced at least a week in advance, and may depend on the progress made by the class. See the note below about plagiarism<sup>2</sup>, which will not be tolerated.

**Final exam (40%).** The instructor reserves the option of making the final exam a take-home exam. If that is the case, you will have several days to complete the final exam, which will be due sometime during finals week. If not, a two-hour exam will be held at the soon-to-be predetermined final exam time during finals week. Unlike homework assignments, you may not discuss the final exam with anyone; signs of collaboration or plagiarism<sup>2</sup> will be dealt with harshly.

## Tentative schedule.

Week 1: Ch 1. Week 2: Ch 2. Week 3: Ch 3. Week 4: Ch 4. Week 5: Ch 5. Weeks 6 and 7: Ch 6. Weeks 8 and 9: Ch 7. Weeks 10 and 11: Ch 8. Weeks 12, 13, and 14: Ch 9 + Brownian motion.

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<sup>1</sup>Brownian motion is not treated in the textbook

<sup>2</sup>Plagiarism is the act of presenting someone else's work as your own. This includes finding the answer to a given problem in a book, in someone else's assignment, or requesting the answer from someone, and/or copying from it. Contrary to popular belief, a correct solution to a given mathematical problem is almost never unique, and plagiarism in a mathematical assignment is very easy to detect.