

MATH-60051 and MATH-70051 Probability Theory I

Fall 2006. Professor Oana Mocioalca

Classroom and time: MSB 376, MTWF 3:20PM-4:10PM

Office: MSB 308,

Office Hours: M: 2:30PM-3:15PM

T: 2:30PM-5:00PM

W: 2:30PM to 3:15PM, or by appointment

Phone: 330-672-9083

e-mail: oana@math.kent.edu

web page: www.math.kent.edu/~oana/math60051

Textbook:

- “Probability and Measure” by Patrick Billingsley, third edition.

Suggested additional reading:

There are lots of books one could read, but the ones that are supplementing our textbook, and are relevant for the Qualifier are

- Kai Lai Chung, A Course in Probability Theory (2nd edition)
- R. Durrett Probability: Theory and Examples (3rd Edition)

Some famous lecture notes that could be downloaded from the Internet. Look on the web page for links.

- Amir Dembo, Probability Theory
- Varadhan, Probability Theory, (Ch. 1 – 3.6).

Other books:

- R.M. Dudley Real Analysis and Probability. Best account of the functional analysis and metric space background relevant for research in theoretical probability.
- Probability with martingales by David Williams
- Probability Theory: An analytic view by Daniel W. Stroock

Prerequisites: Students should be comfortable with probability at least at the level of MATH40011. Because we will develop the measure theoretical results that we need as we go along, measure theory is not a prerequisite for the course. However students are expected to be familiar with real analysis at least at the undergraduate level.

Grading scheme

- Homework assignments: 30%
- Midterms 40%

- Final exam 30%

Homework: The only way to be sure you are learning the course material is to solve problems. Each student must turn in a separate assignment; identical solutions are NOT acceptable. You may consult with your colleagues or me but your homework must reflect YOUR understanding of the material. See the note bellow about plagiarism¹.

Midterms

We will have two in-class midterm exams.

Final Exam The final exam is comprehensive and will be taken in class.

Final exam will be comprehensive on the scheduled date. Signs of collaboration or plagiarism¹ will be dealt with harshly.

Main topics of the course

- Sketch of pure measure theory
- Measure theoretical formulation of the foundations of probability theory
- Convergence of random variable and distributions
- Classical theory of sums of independent variables: law of large numbers
- Conditional probability and Expectation
- Martingales

¹Plagiarism is the act of presenting someone else's work as your own. This includes finding the answer of a given problem in a book, in someone else's assignment, and copying it. Plagiarism in a mathematical assignment is very easy to detect as a correct solution to a mathematical problem is almost never unique.