

Syllabus: 36-752 Advanced Probability Overview; Spring 2012

Last Updated January 12, 2012

This is intended to be a first course in measure-theoretic probability theory. Topics in the course will include the following: σ -fields, measures, probabilities, extension and uniqueness of measures, random variables, distributions, measurable functions, integration, convergence of integrals, L^p spaces, densities, product spaces, product measures, independence, basic stochastic processes, convergence of random variables, sums of independent random variables, characteristic functions, convergence in distribution and related limit theorems, conditional expectation, conditional distributions, martingales. Some topics may be omitted if necessary due to time constraints.

In addition to the above topics, for many students this class will serve as an introduction to constructing and following abstract mathematical proofs.

Important information:

- Lectures are 9:30am to 10:20am, Mondays, Wednesdays and Fridays, in A22 Porter Hall.
- My office is 132C Baker Hall.
- I will hold a weekly office hour every Wednesday at 1:00pm. Individual appointments can be arranged if a student cannot make it to the office hour (just ask).
- My email address is shanneke@stat.cmu.edu.
- The course web site is located at <http://www.stat.cmu.edu/~shanneke/classes/36-752>. The course schedule, lecture notes, homework assignments, and solutions will be posted there as we go.
- The course will closely follow a set of lecture notes, originally authored by Mark Schervish, and passed down with some modifications by Chad Schafer; each lecture will be posted on the class website prior to the lecture. You may wish to print the notes prior to the lecture and bring them with you.
- The TA for the course is Wanjie Wang (wwang@stat.cmu.edu).
- The text is *Probability & Measure Theory*, Second Edition, by Ash and Doleans-Dade, Academic Press, 2000.
- There will be frequent quizzes, roughly one every two weeks, always from 10:00am-10:20am on a Friday. These are for your benefit, to provide an objective check on whether you are keeping up with the material. Falling behind even a little in this class can easily snowball to a point where catching up becomes difficult, so try to keep up.
- There will be regular homework assignments, again roughly one every two weeks, and each will be due about a week after issued. Solutions will be posted after the assignment is due, so it is important to turn in your assignments on time.
- There will be no midterm exam, but there will be a comprehensive final exam.
- Course grades will be based 50% on quiz scores, 20% on homeworks, and 30% on the final exam. However, if a student falls behind in quiz scores, if necessary some make-up credit may be possible through an additional course project, arranged via discussion with the instructor.