Math 418/544   Probability I   Fall 2015

Instructor: Omer Angel.
Contact: angel@math.ubc.ca
Lectures: MWF 10:00-10:50 at Math 202.
Course webpage: `http://www.math.ubc.ca/˜angel/probab`
Office hours: Mon 14:00-15:00, Fri after class or by appointment, at Math Annex 1210

Text: R. Durrett. *Probability: Theory and Examples.*

Course outline:

Together with Math 419/545 in term 2, these courses give a comprehensive introduction to (mathematically rigorous) probability theory for graduate students and math honours undergraduates. The course is intended to be useful for those who use probability as a tool in other fields, or planning to do research in probability. (Probability theory has applications in analysis, statistics, finance, applied mathematics, combinatorics and number theory and has ties to many other fields.)

Background in measure theory (e.g. math 420) is not strictly required, and the requisite notions will be introduced in class. Some results from measure theory will be stated without proofs. However, familiarity with general measures will be useful to derive full benefit from the course. If you see them here for the first time, this may be a lot to take in at once.

Topics in term 1 include the following: Probability spaces, random variables, expectation and moments, modes of convergence, independence, the Borel-Cantelli Lemma, Kolmogorov 0-1 Law, characteristic functions, weak convergence, the law of large numbers and central limit theorem, Poisson convergence. Random walks, stopping times, conditional expectation, Martingales, as well as many applications.

Further Reading. There are many written resources. a few textbooks that cover much of the course material:
A. Klenke. *Probability Theory: A Comprehensive Course.*
D. Williams. *Probability with Martingales.*
P. Billingsley. *Probability and Measure.*
O. Kallenberg. *Foundations of Modern Probability.*
D W. Stroock. *Probability Theory. An analytic view.*
K L. Chung. *A course in probability theory.*
L. Breiman. *Probability.*

Evaluation: Homework are 70% of the final mark. There will be roughly weekly assignments. You are encouraged to work on problems with other students, but must write the solutions on your own. Late submissions will not be accepted. A final exam in December is the other 30%. Grades are usually scaled.