Syllabus for Honors Probability and Statistics, Fall 2004

Instructor: Ernie Croot
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Place and Time: Room 256 Skiles, MWF 1:05-1:55.

Office Hours: Tentatively, these will be Tuesdays and Thursdays from 1:00-2:00.

Recommended Texts: Introductory Probability and Statistical Applications, 2nd edition by Meyer. Another, more advanced book that is recommended is Probability with Martingales by Williams.

Web Page: http://www.math.gatech.edu/ecroot. I will post a copy of this syllabus there, as well as information about homeworks, lecture notes, and exams.

Grading Policy: 30% for homeworks, 20% for each of the two midterms, and 30% for the final exam. I will also be using a “maximal grading policy”, and here is how it works: Suppose HW, MT1, MT2, and FE are each of your homework, midterms, and final exam grades out of 100 points. Then, your final grade in the course, out of 100 points, is computed using the formula

\[
\text{Final Grade} = \max(\text{FE}, 0.3(\text{HW}) + 0.2(\text{MT1} + \text{MT2}) + 0.3(\text{FE})).
\]

The letter grade assigned will be based on the usual 10 point scale: 90 - 100 is an A, 80 - 89 is a B, 70 - 79 is a C, 60 - 69 is a D, and anything below 60 is a failing grade.

Student Disability: Students with disabilities who require reasonable accomodations to fully participate in course activities or meet course requirements are encouraged to register with the ADAPTS-Disability Services Program at (404)-894-2564 or www.adapts.gatech.edu and contact me to discuss access issues.

Missed exams and homeworks: If you miss an exam, you must have a valid reason for doing so, such as a family or medical emergency, and you must present it to me in writing. When you miss an exam you will not be allowed to take a makeup; instead, I weight the other coursework accordingly to fill in for the missed exam. For example, if you miss the first midterm, I may decide to weight the second midterm twice as much.

Course Material: First I would like to say that I am not a probabilist, but I use a lot of probability theory in the research that I do. Therefore, the high-level examples or applications of probability theory that I will lecture on will likely have a combinatorial and number theoretical flavor. That said, I will not make any promises about such applications that I plan to cover in this course.

I will, however, promise to teach you all the usual topics that one is expected to learn in a probability and statistics course. These topics include: basic logic, mathematical models, basic set theory, sample spaces, probability measures, conditional probability, Baye’s
Theorem, independent events, random variables, distributions, densities, expectation, variance, Chebyshev’s inequality, the second moment method, conditional expectation, various types of distributions, moment generating functions, law of large numbers, the central limit theorem, confidence intervals. I plan to also cover a few more advanced topics such as the Borel-Cantelli theorem, 0-1 Laws, maximal deviations, and possibly Martingales.

The homework in the course will collected once every two weeks, and you are encouraged to work together on the problems; however, you should not copy (i.e. plagiarize) your study partner’s work, but should supply your own writeups.