

STAT/MATH 394 A - Probability I

Summer 2009 - Term A

Time and Place

MWF 8:30-10:40 am in Mechanical Engineering (MEB) 248. Class sessions will be from Monday, June 22 to Wednesday, July 22. The final exam will be in class on Wednesday, July 22. The course website is

www.stat.washington.edu/courses/stat394/summer09.

On this website you'll be able to find the course notes, homework assignments and solutions, exam solutions, and other information pertaining to the course. The website will also include links to the following resources:

- A message board for the class. *This message board can be a very good resource for you.* In particular, *it will include homework help*, in which everyone in the class (not just me!) can help you out. It will also include class announcements. Note that you can set it so that you get notified by email every time a post is added to the message board.
- A link to an electronic homework submission form. While you are free to turn in all your homework assignments in class, you may want to submit them electronically if you compose them on the computer and can't get to a printer. See the homework section below for details.
- A way to send an anonymous email to the instructor. I encourage you to have open communication with me, even if you want to do so anonymously.

This website should be checked periodically.

Course Personnel

Instructor: Nathaniel Derby

Office: Padelford A-317

Office Hours: Mondays and Wednesdays 11:00-12:00

Virtual Office Hours: Almost every day, at various times (see below)

Phone: (206) 543-3871 (No answering machine! Email is better)

Email: nderby@stat.washington.edu

I am a visiting lecturer, and will probably not be at the above office after this summer term. However, the email address will always work.

Virtual Office Hours are times that I will be making comments on the class message boards (explained above). These message boards are organized by subject, and there will be a discussion open for each homework assignment - on which the grader or I will provide answers to questions at least once per day. However, *do not depend on me to write much on it the day before a homework is due*. This is because I may or may not have time to write on it on a given day. Thus, it's best to plan ahead on these homeworks assignments. My suggestion: Do the brainstorming/thinking part of the problems over the first few days of having the assignment, so that by the last couple days, you will have figured out the answers and just have to write them up, and thus won't need much help from me or anyone else.

Prerequisites

- 2.0 in MATH 126 or MATH 136 (multivariate calculus and infinite series).
- Recommended: Any course with combinatorics or discrete math in it (e.g., MATH 300, MATH 381).

Overall, a firm mastery of multivariable calculus and basic combinatorics (counting methods) will serve you well.

Text

No textbook is necessary – I will be lecturing from my notes, which can either be downloaded free from the class website or bought (bounded) for about \$22 from Ave Copy Center (4141 University Way NE). Note that my notes are likely to have some typos in them. These corrected typos will be shown on the online version [in blue](#). Therefore, if you see something in your notes that doesn't look right, check the online version to see if it's a (corrected) typo – if so, make the change in your own copy accordingly.

However, if you would like a textbook for reference, the course has a suggested textbook:

- *A First Course in Probability*, 6th edition (2002) or 7th edition (2006), by Sheldon Ross. Since this would be used for your reference only, *I don't care which edition you use* – feel free to use an earlier edition if you'd like. However, I would suggest avoiding the latest edition (8th edition, 2009), which is very expensive.

Note that some concepts are explained or defined differently in the above book than in our class notes.

Beyond that, you might want to read some probability books for fun, such as the following:

- *Chance: A Guide to Gambling, Love, the Stock Market, and Just About Everything Else*, by Amir D. Aczel.
- *How to Lie with Statistics*, by Darrell Huff.
- *Chances Are: Adventures in Probability*, by Michael and Ellen Kaplan.
- *The Drunkard's Walk: How Randomness Rules Our Lives*, by Leonard Mlodinow.
- *The Lady Tasting Tea: How Statistics revolutionized Science in the Twentieth Century*, by David Salsburg.

These are just suggestions. Note that a couple of the above books are more about statistics than probability, and that some of them I haven't even read yet. The point is that if you have the time, pick a book about probability that you find interesting and would want to read for fun, whether or not it's on the list above. There are books about probability and history, probability and logic, probability and philosophy, and the like. I have my preferences for probability pleasure reading, and you most likely will have yours. Doing some pleasure probability reading will make probability a little more interesting and real for you, in a context very different from this class.

Grading

- Homework: 35%
- Midterm Exam: 35%
- Final Exam: 40%

Yes, these percentages add up to 110%. The category with your worst grade will count 10% less than indicated.

Homework

Homework will be assigned at least a week before the due date and will be due as on the schedule below, at the beginning of class (8:30 am). These will be given in class and on the course website. Each turned in item receives an initial grade of x , then the actual grade is $y = xe^{-h/240}$, where h is the number of hours after the due date and time I receive the work. **There will be no homework accepted after 48 hours after the due date and time.**

There will be extra-credit questions on each homework assignment. Thus, it is possible to get more than 100% on any assignment.

After homework is turned in and graded, solutions will be posted on the course website. Some guidelines:

- Show all your work! Provide details in your solutions. If you do not show me every step, some credit will be taken off.
- Please write neatly and legibly! Your name must be written clearly on all homework, and all pages must be stapled together. *Please do not paper-clip your pages together.* I will provide a stapler in the classroom when homework is due if you need it.
- You may discuss homework problems with your classmates, either in person, over email, or over the message boards. However, you must hand in your own written-up solutions.

As briefly mentioned above, if you like to do your homework writeups on the computer (perhaps using L^AT_EX), you can submit them electronically through the course website. However, note that *homeworks submitted electronically are due on the same date and time as in class.*

We will try to return graded homework to you promptly.

Syllabus

Below is a tentative schedule for the course. This may change as the course progresses. Note that the “sections” and “pages” columns refer to the course notes.

Date	Due	Sections	Pages	Material
6/22		1.1	1-4	Class introduction, set theory
6/24		1.2-2.4	5-14	Set functions, sample spaces, events, probability measure, combinatorics
6/26		2.5	14-19	Combinatorics, counting, discrete probability
6/29		2.6-2.8	19-27	Continuous probability, random variables, distribution function
7/1	HW1	2.9-2.10	28-34	n -Dimensional discrete and continuous random variables
7/3				HOLIDAY (Independence Day)
7/6		3.1	35-39	Conditional probability
7/8				MIDTERM
7/10	HW2	3.2-4.1	40-48	Independence, binomial and hypergeometric distributions
7/13		4.1-4.2	48-55	Poisson distribution, Poisson process, uniform distribution
7/15		4.2	55-63	Exponential distribution, Poisson process, normal distribution
7/17	HW3			Catch-up, examples, review
7/20				Review for final exam
7/22				FINAL EXAM

L^AT_EX

L^AT_EX is an open-source typography software that is often used to create documents with mathematical equations in them. For example, the class notes and this document are produced in L^AT_EX. While L^AT_EX is very popular in math and science communities, it can be used in many other settings. With or without mathematical content, its output is superior to that of word-processing software like MS Word or OpenOffice.org. As such, I personally use L^AT_EX to produce nearly all documents, for academic, business and personal uses.

This course is “L^AT_EX compliant” – meaning that every homework assignment (written in L^AT_EX) has its L^AT_EX source code posted on the class website. If you would like to write up your homework in L^AT_EX, simply download the source code, plus a couple supplementary files from the website, and write in your solutions to each problem. Solutions written up in L^AT_EX may be submitted electronically (through the form on the website) or printed up and personally handed in. Using L^AT_EX for your homework is completely optional.

If you have never before used (or heard of) L^AT_EX and would like to learn more about and/or install it, there is an installation guide on the course website. I’d be happy to give you the software and some sample files on a CD (the installation files are generally too big to be downloaded) to get you started.

Additional Comments

- *This is an accelerated course.* Therefore, attendance at all class sessions is essential.
- Doing lots of homework problems is the best way to learn the material. Read the exercises and solutions in the course notes (chapter 11) if you don’t understand the concepts - they should help you. If you don’t understand the material, try doing extra problems from the course notes (chapter 10, to be checked in chapter 11). Work on extra problems besides the homework.
- I am a professional statistician and SAS (statistical software) programmer in the business world. If you are interested in learning about doing either business statistics or SAS programming – possibly for career opportunities – feel free to chat with me outside of class!