MATH 154 - PROBABILITY THEORY, SPRING 2018

MWF 12PM-1PM, SC 221

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Course assistant: TBA

Course website: http://math.harvard.edu/~sebv/probability-spring-2018/

Course overview. The course aims to introduce you to the fundamentals of probability theory and random processes. This will give you the background and tools that are needed for applying probability theory to fields such as computer science, engineering, physics or social sciences.

Course text. There are is a single required text book for this course which is *Probability and Random Processes* (third edition) by Geoffrey Grimmett and David Stirzaker. It is published by Oxford University Press. *Please make sure to get the third edition!*

Here are some other *optional* references, in rough order of difficulty:

- Sheldon Ross, *A first course in probability*. 8th ed., Pearson Education, 2009.
- William Feller, *An introduction to probability theory and its applications*. Vols 1&2, Wiley.
- Jeffrey S. Rosenthal, *A first look at rigorous probability*. World Scientific, 2006.
- David Williams, *Probability with Martingales*. Cambridge University Press, 1991.
- Daniel W. Strooks, *Mathematics of probability*. American Mathematical Society, 2013.

Prerequisites. I will assume that you have some familiarity with proofs and basic calculus. For this reason, a previous mathematics course at the level of Math 19ab, 21ab, or a higher number, is required. For students from 19ab or 21ab, previous or concurrent enrollment in Math 101 or 112 would be very helpful. Freshmen who did well in Math

23a, 25a or 55a fall term are also welcome to take the course. If you have doubts about whether you satisfy the prerequisites for this course, please feel free to ask me about it.

Assessment. Your grade for the course will be determined by scores on homework assignments, a take home midterm exam, and a take home final exam as follows:

- The *take home midterm* will be handed out on March 5 and due the next day. It will count for *30%* of your final grade.
- The *take home final exam* will be handed out on April 25 and due the next day. It will count for *40%* of your final grade.
- There will tentatively be 12 *homework assignments*. Cumulatively, they will count for *30%* of your final grade. See below for more details on homework assignments.

The *highest* grade cutoffs will be as follows: 90%: A, 80%: B, 70%: C, 60%: D. These cutoffs *might* be lowered, but will not be raised.

If you qualify for special accommodation (such as extra time) for the tests, or if you already know you will not be able to take one of the tests at the planned time (e.g. because of a religious observation or a university event), you should let me know as soon as possible.

Homework assignments. They will be announced in class and posted on the course website. Solutions will typically be posted the day after an assignment is due. Assignments will usually be due at the *beginning* of class. Only half credit will be given if an assignment is turned in after class, and no credit if it is turned in after solutions have been distributed. If you can't make it to class, put your assignment in my mailbox (near the main math department office on the third floor of the Science Center) or slide it under my office door. I don't check my mailbox very often, so let me know promptly by email if you choose the former option.

Assignments are one of the key elements of this course. You should make every effort to write down your thoughts clearly and precisely. Your writeup should contain little to no extraneous material (no scrap work). I also encourage you to *be intellectually honest*: it is better to say that you are not exactly sure how to solve a problem / justify a particular step and write your thoughts than to write three pages of obscure equations and hope the grader will trust your solution to be correct.

On the first page of your assignment please include:

- Your full name.
- The *list of other students with whom you collaborated* (if any).

As long as you list your collaborators, collaboration is allowed and encouraged. You may discuss ideas on, and even possible solutions of, specific problems. *However*, you may *not* maintain a record (written, audio, photographic, etc.) of the discussion. This means that *you are required to write up solutions entirely on your own* and that you cannot show the assignment you are submitting to other students. For example, if you discuss a problem with others using a blackboard, you must erase the board once the discussion is over and write up your solution on your own.

Reading assignments. The reading assignments that are relevant for each lecture of any given week will be posted to the course website at the end of the previous week. You will benefit from looking at the reading for a lecture before the lecture.

Scheduling a short meeting with me. I would like to have a short one on one 5-10 min chat with you during the first few weeks of the semester, just so that I can know your face, name, and a little bit about your background. Don't be afraid, we're not going to talk math (unless you really want to!). You don't need to prepare anything for the meeting.

Please send me an email at `sebv@math.harvard.edu` with subject "154 short meeting" and ask e.g. "is 1pm next Monday okay?". I will either reply yes or give you another time. The meeting will take place in my office, SC 321H.

Other policies.

Contacting me. Feel free to talk to me anytime. I will often be in my office, and you are welcome to drop by, but I might tell you I am busy if you come outside regular office hours. The best way to otherwise contact me is via email, as it provides me with a written record of our conversation.

Attendance. I strongly encourage you not only to attend lectures, but also to actively participate in them: stop me if anything is unclear and feel free to share your thoughts about the material (what do you find easy? What do you find hard?).

I expect your full attention during lectures: no loud conversation, use of cell phones, or other activities unrelated to class.

Grading issues. If you have any questions or complaints concerning the way an assignment has been graded, please come talk to me. You should first look at the official solution and make sure you understand it.

Academic integrity. Any acts of academic dishonesty, such as cheating, plagiarism, etc. will be dealt with according to University Policy. Examples of violation include searching the web (or inside a textbook) for solutions, copying part of another student's assignment or showing your assignment to another student. Please speak to me if you have any questions about this.