

MWF 9:30 – 12:00 pm, Jack Baskin Auditorium 101

<https://ams131-summer18-02.courses.soe.ucsc.edu/home>

**Instructor:** Yonatan Katznelson

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**Required text:** Introduction to Probability, by Blitzstein and Hwang.

**Course Description:** This course provides an introduction to probability theory and its application. Topics include combinatorial analysis, the axioms of probability, random variables, expectation and variance, joint distributions, the law of large numbers, the central limit theorem and Markov chains. For more details see the lecture schedule that follows.

**Quizzes/Exams/Exercises:** There will be four quizzes, one each Friday, and a comprehensive final exam on the last day of summer session. Make-up quizzes will *not* be given, but your lowest quiz score will be dropped. There will also be in-class *exercises* on all non-Fridays. These exercises will be based on the material of the lecture during which they are given. Makeup exercises will also not be given.

**Reading and homework:** The assigned reading (on the lecture schedule that follows) is meant to be completed *before* the lecture that covers that material. You should use the homework (also listed in the syllabus) for each chapter to test your understanding and to prepare for the lecture. After the lecture you should read the chapter(s) again and revisit the homework to reinforce your grasp of the material. Homework will not be collected or graded, but some of the questions on the quizzes and on the final will be very similar to homework problems.

**Comment:** Solutions to problems in the book marked with a Ⓢ may be found at [www.stat110.net](http://www.stat110.net) (then follow the ‘PRACTICE AND SOLUTIONS’ link and click on ‘selected\_solutions...’ at the bottom of the table you find there).

**Sections:** Sections are not mandatory, but are highly recommended. The TAs will review the homework in section as well as answer any other questions you may have.

**Course grade:** The exercises will contribute 15% to your course score and your 3 best quiz scores and final exam score contribute the remaining 85%. If your final score is better than your cumulative quiz score, the final will be worth 50% and the quizzes 35%, and if your quizzes are better than your final, then the quizzes contribute 50% and the final contributes 35%. Letter grades will correspond (approximately) to the following ranges:

Score	Grade
90% – 100%	A– to A+
80% – 89%	B– to B+;
65% – 79%	C to C+
60% – 64%	C-
50% – 59%	D
0% – 49%	F

**Students with disabilities:** If you qualify for classroom/exam accommodations because of a disability, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me as soon as possible, preferably within the first few days of the course. Contact DRC by phone at **831-459-2089** or by email at **drc@ucsc.edu** for more information.

## TIPS FOR SUCCESS

1. Come to all the lectures, and come prepared — read the assigned chapters/sections at least once *before the lecture*, so you have an idea of what we will be discussing in the lecture. You don't have to read the material in depth the first time through. Have a look at the homework for the sections you have read — take note of the problems you find difficult or mysterious.
2. Read the material again after the lecture, this time in more depth. Read actively: take notes, try to work through the examples on your own.
3. Work in detail on the relevant homework problems after the second reading. Make a note of the problems that you don't understand so that you can ask about them.
4. **Ask questions** in class, during office hours and in section. Remember: the more specific your question, the better and more helpful the answer is likely to be.
5. Study with friends for a few hours a week. Technical skills can be practiced alone, but concepts should be *discussed*.
6. The standard for a 5-unit course at UCSC is 15 hours a week in a 10 week quarter, including lectures, sections and studying outside of class. In a 5-week summer session course, you should realistically expect to spend about 25+ hours a week with the material in order to succeed.
7. If you feel that you are getting lost, take action. Don't wait and hope 'it goes away'. Come to office hours or ask questions in class (or section) to clear up any confusion.

### **CHEATING:**

Cheating in any form (e.g., using your phone on quizzes or exams, or copying from someone else) will not be tolerated. Any student caught cheating will be reported to the AMS department and to his or her college provost. In most cases, students caught cheating will receive a failing grade. Students who help others cheat are also considered cheaters.

*Cheating devalues everyone's grades.  
You should not tolerate it either.*

**Lecture Schedule (subject to change)...**  
**... with Quiz/Exam Dates (not subject to change).**

**Monday, 7-30:** Introduction. Different views of probability. Axioms

*Reading:* Chapter 1.

*Homework.* Chapter 1: 2, 3, 6, 8, 15, 16, 21, 22, 29, 31, 32, 42, 43, 47, 48, 59.

**Wednesday, 8-1:** Conditional probability. Bayes' rule.

*Reading:* Chapter 2.

*Homework.* Chapter 2: 1, 2, 3, 6, 8, 15, 20, 22, 30, 35, 57.

**Friday, 8-3:** Discrete random variables. *Quiz 1*

*Reading:* Chapter 3.

*Homework.* Chapter 3: 1, 2, 4, 6, 7, 15, 16, 22, 25, 28.

**Monday, 8-6:** Discrete random variables (cont.); Expectation.

*Reading:* Chapters 3 and 4.

*Homework.* Chapter 3: 38, 39, 41, 42; Chapter 4: 1, 3, 4.

**Wednesday, 8-8:** Expectation

*Reading:* Chapter 4.

*Homework.* Chapter 4: 10, 13, 16, 17, 23.

**Friday, 8-10:** Variance; the Poisson distribution. *Quiz 2*

*Reading:* Chapter 4.

*Homework.* Chapter 4: 5, 6, 24, 27, 29, 30, 33, 35, 45, 65.

**Monday, 8-13:** Continuous random variables.

*Reading:* Chapter 5.

*Homework.* Chapter 5: 1, 3, 4, 5, 8, 11, 12, 18, 21, 24, 30, 38, 44.

**Wednesday, 8-15:** Joint distributions.

*Reading:* Chapter 7 – Sections 7.1 - 7.3.

*Homework.* Chapter 7: 1, 3, 5, 7, 11, 14, 15, 38, 39,

**Friday, 8-17:** Joint distributions, (cont). *Quiz 3*

*Reading:* Chapter 7 – Sections 7.3 – 7.5.

*Homework.* Chapter 7: 16, 17, 18, 20, 21, 31, 52.

**Monday, 8-20:** Conditional expectation.

*Reading:* Chapter 9.

*Homework.* 1, 5, 6, 7, 10(a,b).

**Wednesday, 8-22:** Inequalities and limit theorems.

*Reading:* Chapter 10 — Section 10.1

*Homework.* 1, 2, 4, 5, 7.

**Friday, 8-24:** Inequalities and limit theorems (cont). *Quiz 4*

*Reading:* Chapter 10.

*Homework.* 17, 18, 22, 27, 33(a,b), 34(a,b).

**Monday, 8-27:** Markov chains.

*Reading:* Chapter 11.

**Wednesday, 8-29:** Review.

*Reading:* Review problems; Quizzes

**Friday, 8-31:** ***FINAL EXAM*** (in class, 9:30 am - 12:00 noon)