

Instructor: Matthew Heiner

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Office Location: Baskin Engineering (BE) room 358

Office Hours: Wednesday @ 1 - 2 pm, Friday @ 9 - 10 am

Course Description: This course introduces probability and statistics with an emphasis on applications to the natural and social sciences. Statistical methods provide tools for understanding and appropriately accounting for variability, which naturally comes with data. We will discuss how to collect and analyze data to reach scientifically sound conclusions. While you will learn to do various calculations, our principal goal is to learn how to think critically when faced with data as evidence, select appropriate tools, and be able to interpret (numerical) results.

Lectures: Monday and Wednesday, 9:00 am - 12:30 pm, Physical Sciences 130. ([Map](#))

Web page: The course is hosted on *Canvas* (<https://canvas.ucsc.edu>), where you can log in using your Gold ID and password. Check *Canvas* frequently for announcements, reading quizzes, homework assignments, posted class materials, and grades.

Text: *Biostatistics for the Biological and Health Sciences*, Triola, Triola, and Roy, Pearson 2nd Edition (2017). Because homework will be graded, the newer, second edition is required.

Discussion Sections: The TA will work through examples and answer questions about the assigned homework. Attendance is optional, but strongly encouraged.

Discussion	Time	Location
DIS 01A	Friday @ 12 - 1 pm	Social Sciences 1 room 145

Teaching Assistant

Name	Email	Hours	Location
Kurtis Shuler	kshuler@ucsc.edu	Thursday @ 1 - 2:30 pm	BE room 312 C/D

Computer Labs: The online lab course **AMS 7L** is a co-requisite. The material will be related, but AMS 7L is a separate course for which you will receive a separate grade. All questions, especially administrative ones, regarding AMS 7L should be answered by the lab instructor, Daniel Kirsner (dkirsner@ucsc.edu).

Reading and homework: We will cover the material in this course quickly. To encourage staying up to date in reviewing the relevant sections of the text, there will be a short reading quiz on *Canvas* before each lecture. A tentative schedule with reading for each class is listed at the end of this document. Homework problems will be posted on *Canvas*. You should use the homework to test your understanding, review after the lecture, and as practice for exams. Only even-numbered homework problems will be collected and graded, but questions on the exams may be similar to any assigned exercise.

Grading Policy and Exam Information:

- **Reading quizzes (5%):** The schedule at the end of this syllabus lists textbook sections that will be covered in each lecture. Before each lecture (excluding the first lecture, midterm, and final), a short reading quiz covering the corresponding book sections will be open on *Canvas* and due at the start of lecture. The quiz is open-book, but you are expected to complete the quiz alone, without any other help. The lowest of your six quiz scores will be dropped.
- **Homework (25%):** Homework exercises from the textbook will be assigned after each lecture and posted on *Canvas*. The odd-numbered problems are intended as practice and will not be collected. Each Monday, even-numbered problems assigned the previous week will be collected and graded. Many problems will simply be checked for completion, and others will be graded for correctness. No late homework will be accepted. However, the lowest homework score will be dropped. While I encourage you to work in groups, each student must write their own solution to each problem.
- **Midterm (30%):** There will be one midterm exam on **July 16**. The midterm will cover material from chapters 1-6. Be sure to bring a calculator. You must show all work for full credit. There will also be a take-home component of the midterm assigned on July 11 and due in class on July 16.
- **Final (40%):** The final exam will be in class on **July 25**. Be sure to bring a calculator. The final will be a comprehensive exam, covering all chapters discussed in class. There may also be a take-home component of the final exam.
- **Additional information about exams:** You will need a calculator for the midterm and final. You cannot use a cell phone, tablet, or computer as a calculator. It is important that the calculator has a square root key and logarithms, in addition to the usual arithmetic operations. All the exams and quizzes are closed-book. You may bring a single page (8.5 by 11 inches, both sides) of hand-written notes prepared by you. These notes should have your name and will be collected with your exam. You are not allowed to include solutions to specific homework problems in this sheet. You must show all your work (when applicable) on the exams to get full credit.

Letter grade assignments 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

Your final grade will be no lower than what is indicated by this table. I will not bargain or round for cases that are borderline between different grade levels. However, I will offer various extra credit opportunities throughout the class.

Regrading request: If you feel that a regrade request can be justified, write your appeal on a paper, staple it to the front of your exam and give them to the TA or me. Any regrading request

should be submitted within one week after it has been returned to the class. No exam will be regraded if there is any additional writing on the exam, in any location.

DRC accommodation: The Disability Resource Center (DRC) reduces barriers to inclusion and full participation for students with disabilities by providing support to individually determine reasonable academic accommodations. If you have questions or concerns about exam accommodations, or any other disability-related matter, please contact the DRC office, located in Hahn 125 or at 831-459-2089 or drc@ucsc.edu. If you qualify for and seek classroom/exam accommodations, please submit your Accommodation Authorization Letter from the DRC to me as soon as possible, preferably within the first few days of the course.

Academic dishonesty: Academic integrity is the cornerstone of a university education. Academic dishonesty diminishes the university as an institution and all members of the university community. It tarnishes the value of a UCSC degree. All members of the UCSC community have an explicit responsibility to foster an environment of trust, honesty, fairness, respect, and responsibility. All members of the university community are expected to present as their original work only that which is truly their own. All members of the community are expected to report observed instances of cheating, plagiarism, and other forms of academic dishonesty in order to ensure that the integrity of scholarship is valued and preserved at UCSC.

In the event a student is found in violation of the UCSC Academic Integrity policy, he or she may face both academic sanctions imposed by the instructor of record and disciplinary sanctions imposed either by the provost of his or her college or the Academic Tribunal convened to hear the case. Violations of the Academic Integrity policy can result in dismissal from the university and a permanent notation on a student's transcript. For the full policy and disciplinary procedures on academic dishonesty, students and instructors should refer to the Academic Integrity page (https://www.ue.ucsc.edu/academic_misconduct) at the Division of Undergraduate Education.

Title IX: The university cherishes the free and open exchange of ideas and enlargement of knowledge. To maintain this freedom and openness requires objectivity, mutual trust, and confidence; it requires the absence of coercion, intimidation, or exploitation. The principal responsibility for maintaining these conditions must rest upon those members of the university community who exercise most authority and leadership: faculty, managers, and supervisors. The university has therefore instituted a number of measures designed to protect its community from sex discrimination, sexual harassment, sexual violence, and other related prohibited conduct. Information about the Title IX Office, the online reporting link, applicable campus resources, reporting responsibilities, the UC Policy on Sexual Violence and Sexual Harassment and the UC Santa Cruz Procedures for Reporting and Responding to Reports of Sexual Violence and Sexual Harassment can be found at titleix.ucsc.edu. The Title IX/Sexual Harassment Office is located at 105 Kerr Hall. In addition to the online reporting option, you can contact the Title IX Office by calling 831-459-2462.

Session deadlines:

- Drop: Monday, July 2
- Change grade option: Friday, July 6
- Withdraw: Friday, July 13

Summer Session does not drop students for non-attendance or non-payment. Students must drop themselves.

Tentative Course Outline:

Coverage subject to change.

Date	Sections	Topics
June 25	1.1 1.2-1.3 2.3-2.4	Intro to the course, statistical thinking Data types, collecting data Looking at data
June 27	2.1-2.2 3.1-3.2 3.3 3.3	Distributions, histograms Measures of center, variation Relative standing (standardizing) Exploratory data analysis
July 2	4.1 4.2 4.3 4.4 5.1	Probability Probability rules Bayes' theorem Risks and odds Probability distributions
July 4		Holiday – no class
July 9	5.2-5.3 6.1-6.2, 6.5	Discrete distributions – binomial and Poisson Normal distribution
July 11	6.3 6.4, 6.6 7.1-7.2	Sampling distributions Central limit theorem Estimation, confidence intervals
July 16	7.1-7.2 8.1 8.3	Midterm Exam at 9:00 am in class Confidence intervals, sample size Hypothesis Testing Testing means
July 18	8.2 8.1 9.1-9.2 9.3	Testing proportions Power, P-values Two-sample tests Tests for two dependent samples
July 23	10.1 10.2-10.3 10.4 12.1 11.1-11.2	Correlation Regression Multiple regression ANOVA Categorical data
July 25		Review Final Exam at 10:30 am in class