

Instructor: Matthew Heiner

Email Address: mheiner@ucsc.edu

Office Location: Baskin Engineering (BE) room 358 ([Map](#))

Office Hour: Wednesday @ 11 am - 12 pm

**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, Wednesday, and Friday 8:00 - 9:05 am, J. Baskin Auditorium 101. ([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).

**Discussion Sections:** The TA will work through examples and answer questions about the assigned homework. Attendance is optional, but strongly encouraged. Solutions to the even-numbered homework exercises will not be distributed, so we encourage you to check your answers in discussion section. Graded quizzes will be passed back in discussion section.

Discussion	Time	Location
DIS 01A	Th @ 1:30 - 3:05 pm	Physical Sciences room 140
DIS 01B	Tu 3:20-4:55 pm	Earth & Marine B210
DIS 01C	M 5:20-6:55 pm	Earth & Marine B210
DIS 01D	M 7:10-8:45 pm	Earth & Marine B210

### Teaching Assistants

Name	Email	Hours	Location
Jiajie Kong	jkong7@ucsc.edu	Tuesdays @ 10-11 am	Baskin Engineering room 312 C/D
Zhixiong Hu	zhu95@ucsc.edu	Tuesdays @ 2-3 pm	Baskin Engineering room 119

**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 instructors, Arthur Lui (alui2@ucsc.edu) and Kurtis Shuler (kshuler@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. Homework will not be collected or graded, but questions on the quizzes will be similar to homework problems.

### Grading Policy and Exam Information:

- **Reading quizzes (10%):** The schedule at the end of this syllabus lists textbook sections that will be covered in each lecture. Before each lecture (excluding the first week and quizzes), 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 five (5) of your 20 quiz scores will be dropped.
- **In-class quizzes (40%):** There will be four (4) quizzes as indicated on the schedule. They will be held on **January 23, February 8, February 25, and March 13**. Questions will be similar to homework problems. The quizzes are closed-book and must be completed individually without assistance, but you should bring a calculator. You must show all work (where applicable) for full credit. Only the two highest quiz scores will count toward your grade (the two lowest scores will be dropped). This is meant to account for nearly all reasons you might have to miss a quiz, including illness or adding the class (in the case of Quiz 1). There will be no make-up for quizzes.
- **Final exam (50%):** The final exam will be held in our classroom on **Monday, March 18 at 4 - 7 pm**. Be sure to bring a calculator. The final will be a comprehensive exam, covering all chapters discussed in class. As with quizzes, it is closed-book and to be completed individually, without assistance.
- **Additional information about exams:** You will need a calculator for all quizzes and the 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 quizzes and the final are closed-book. On the final only, 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 receive 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:** UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me privately during my office hours or by appointment, preferably within the first two weeks of the quarter. At this time, I would also like us to discuss ways we can ensure your full participation in the course. I encourage all students who may benefit from learning more about DRC services to contact DRC by phone at 831-459-2089, or by email at [drc@ucsc.edu](mailto:drc@ucsc.edu).

**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](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](http://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.

**Winter 2019 Quarter deadlines:**

- Add/Drop/Grade: Monday, January 28
- Withdraw: Tuesday, February 19

## Tentative Course Outline:

Coverage subject to change.

Date	Sections	Topics
January 7	1.1	Intro to the course, statistical thinking
January 9	1.2-1.3	Data types, collecting data
January 11	2.1-2.4	Looking at data, distributions
January 14	2.1-2.2, 3.1	Distributions, histograms, measures of center
January 16	3.2-3.3	Measures variation, relative standing (standardizing)
January 18	3.3	Exploratory data analysis
January 21		Holiday – no class
January 23		<b>Quiz 1</b> (covering 1.1-3.3)
January 25	4.1-4.2	Probability
January 28	4.2-4.3	Probability and Bayes' Theorem
January 30	4.4, 5.1	Risks and odds, probability distributions
February 1	5.2-5.3	Discrete distributions – binomial and Poisson
February 4	6.1-6.2, 6.5	Normal distribution
February 6	6.3-6.4, 6.6	Sampling distributions, Central Limit Theorem
February 8		<b>Quiz 2</b> (covering 4.2-6.5)
February 11	7.1-7.2	Estimation, confidence intervals
February 13	7.2	Confidence intervals, t-distribution
February 15	7.2, 8.1	Confidence intervals for proportions, sample size, hypothesis testing
February 18		Holiday – no class
February 20	8.3	Testing means
February 22	8.1-8.2	Testing proportions, power, P-values
February 25		<b>Quiz 3</b> (covering 7.1-8.3)
February 27	9.1-9.2	Two-sample tests
March 1	9.3	Tests for two dependent samples
March 4	10.1-10.2	Correlation, regression
March 6	10.3	Regression
March 8	10.4, 12.1	Multiple regression, ANOVA
March 11	11.1-11.2	Categorical data
March 13		<b>Quiz 4</b> (covering 9.1-12.1)
March 15		Review
March 18		<b>Final Exam</b> at 4 pm in class