STAT 7
Statistical Methods for the Biological, Environmental, and Health Sciences
Fall, 2021

Instructor: Dr. Zehang "Richard" Li
E-mail: lizehang@ucsc.edu
Office: 537B, Engineering Building 2

TA: Jizhou Kang
E-mail: jkang37@ucsc.edu

TA: Yu "Zoey" Zhu
E-mail: yzhu201@ucsc.edu

TA: Seokjun Choi
E-mail: schoi90@ucsc.edu

Course Meeting Times: 12:00PM - 1:05PM M/W/F
Location: Zoom
Website: Through `Canvas`

Discussion Sessions:

A W 9:20AM - 10:25AM, Seokjun Choi, PhySciences 140

B W 5:20PM - 6:25PM, Seokjun Choi, PhySciences 140

C W 8:00AM - 9:05AM, Yu "Zoey" Zhu, Zoom

D M 2:40PM - 3:45PM, Yu "Zoey" Zhu, Zoom

E F 1:20PM - 2:25PM, Jizhou Kang, Zoom

Office Hours: All office hours will be conducted remotely with links on Canvas.

- Zehang "Richard" Li: W 2:30PM - 3:30PM
- Jizhou Kang: T 2:00PM - 3:00PM
- Yu "Zoey" Zhu: F 4:00PM - 5:00PM
- Seokjun Choi: W 4:00PM - 5:00PM

Course Description: This is a case-study-based introduction to statistical methods as practiced in the biological, environmental, and health sciences. The aim of this course is to understand how a statistical analysis is preformed and to learn how the results from a statistical study are interpreted. We will begin with a general discussion of the steps involved in a statistical study, and how to summarize information in a data set. Then we will introduce concepts of probability and discuss some specific probability distributions. Later, we will move to inference for means and proportions from a population, specifically we will talk about interval estimation, hypothesis testing for one and two samples, power,

and sample size. Finally, we will cover simple and multiple linear regression, Goodness-of-Fit, and one-way analysis of variance.

Textbook and Course Materials: Biostatistics for the Biological and Health Sciences (2nd Edition), M. M. Triola, M. F. Triola,J. Roy. Pearson (2017). The textbook is not required for quizzes and exams, but highly recommended. Additional ungraded practice/review exercises will be assigned from the textbook. If you have another edition, it is likely to work too. But it is your responsibility to get the practice exercises from this edition.

Prerequisites: Score of 300 or higher on the mathematics placement examination (MPE), or AM 3 or AM 6 or AM 11A or AM 15A or MATH 3 or MATH 11A or MATH 19A.

Assessment and Grading:

- Participation (5%).
- Quizzes (35%). There will be 8 quizzes, roughly on a weekly basis. The lowest score will be dropped.
- Midterm (25%). We will have one open book midterm exam on Oct 27 during class time. The exam will be one hour long.
- Final (35%). We will have one open book final exam on Dec 3 during class time. The exam will be one hour long.

Late submissions of quizzes and exams will NOT be accepted or given partial credits, unless in truly exceptional circumstances. There will be no make-up quizzes or exams. In all quizzes/exams where a pdf upload is required, additional time will be given to scan and upload the answer.

Course Expectations: Though attendance is not required, it is strongly recommended. Students may work together on practice problems, but may not copy solutions from other students or from other sources in homework and exams.

Communication: The course webpage (through `Canvas`) will serve as an archive of all materials and announcements. Please use the `Canvas` discussion board to ask questions about homework or other course topics. **Please do NOT email the instructor or TAs for questions related to course logistics and materials.**

Remote learning logistics: We will have three recorded lectures via zoom every week. I will use slides for the lectures, which are not self contained, they are designed for you to take notes. Slides and material presented during lectures will be available on **Canvas**. Additional materials such as practice problems from the textbook will be proposed after each topic covered in class. These exercises will be posted on the slides. Some of them will be addressed during Discussion Sections.

Discussion Sections are not mandatory but highly recommended to attend discussion sections. During the Discussion Sections, TAs will solve problems from the set of exercises that will be posted on **Canvas**. For in-person discussion sections , all campus COVID-19 policies should be followed.

Lab Section (STAT 7L): STAT7L is required to enroll in this class but consider it a separate class. Covered material between STAT7 and STAT7L match, but the focus of both classes are different.

Tentative Schedule:

- Week 1 (9/24) Statistical thinking, data, and data collection.
- Week 2 (9/27) Summarizing data.
- Week 3 (10/4) Probability and Uncertainty.
- Week 4 (10/11) Random variables and probability distributions.
- Week 5 (10/18) Normal probability distributions.
- Week 6 (10/25) Normal probability distributions. *Midterm on Wednesday.*
- Week 7 (11/1) Estimating parameters.
- Week 8 (11/8) Hypothesis testing.
- Week 9 (11/15) Correlation and regression.
- Week 10 (11/22) Regression. *Thanksgiving, no class on Friday.*
- Week 10 (11/29) Analysis of variance. *Final on Friday.*

Support for students with disabilities: 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.

Support for students with other difficulties While we sincerely hope that you will be able to pursue your studies peacefully and worry-free, we are aware that in some cases difficulties happen that are beyond your control. You should always feel free and comfortable to bring up any problem with the instructor, but if this is not sufficient, or if you prefer professional help, here are several campus resources that you may want to consider contacting:

- UC Care which is a confidential space to discuss issues of dating violence, sexual assault and stalking.
- Slug Support where you can ask for help on many practical issues, including dealing with a financial crisis, problems with your living situation, computers, books, etc.
- CAPS, which provides counseling and psychological services to students.

Campus advocacy resources & education: Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the Campus Advocacy Resources and Education (CARE) Office by calling (831) 502-2273. In addition, Counseling and Psychological Services (CAPS) can provide confidential, counseling support, (831) 459-2628. You can also report gender discrimination directly to the University's Title IX Office, (831) 459-2462. Reports to law enforcement can be made to UCPD, (831) 459-2231 ext. 1. For emergencies call 911. Faculty and Teaching Assistants are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Office should they become aware that you or any other student has experienced sexual violence or sexual harassment. If you prefer to speak to someone confidentially, please contact UC Care (see above).

Academic Integrity: 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. Plagiarism of any kind is unacceptable. 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. Any student found in violation of the UCSC Academic Integrity policy may face both academic sanctions imposed by the instructor of record and disciplinary sanctions imposed by the graduate division. 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 at the Division of Undergraduate Education or Graduate Division.

No cheating will be allowed and will be sanctioned with the lowest score (0%) with no possibility of dropping that grade from the final grade.