STA 100: Applied Statistics for Biological Sciences
A01/A02 — Summer Session I 2023

Instructor Information

Name: Yidong Zhou
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Office Hours: T 2 – 3 pm, W 2 – 4 pm at MSB 4208

Class Information

Dates: June 26 – August 4
Time: MTW 12:10 – 1:50 pm
Classroom: Wellman Hall 234

Discussion Information

Section	CRN	Time	Location	TA
A01	53392	R 12:10 – 1:50 pm	Laboratory Teaching and Learning Complex 1214	Su I Iao
A02	53393	R 10:00 – 11:40 am	Laboratory Teaching and Learning Complex 1218	Su I Iao

TA Email: siao@ucdavis.edu
TA Office Hours: R 2 – 4 pm at MSB 1117

Course Description

This course provides an introduction to statistical methods used in biological sciences. The course covers basic descriptive statistics, probability, estimation of means and proportions, comparison of means and proportions, contingency table analysis, goodness of fit tests, analysis of variance and regression. The course will also emphasize the use of the R statistical computing environment for data analysis. *Prerequisites: MAT 016B or equivalent*.

Course Objectives

The goal of the course is the introduction of statistical techniques typically encountered in biological data. Examples will be drawn from biology, human and veterinary medicine. At the end of the course you will be able to:

- Examine and summarize data.
- Understand and interpret statistical techniques commonly used in biological applications.
- Analyze data from start to finish.

[1] Any email questions should be first addressed to the TA and referred to the instructor if necessary. Please, restrict emails to administrative questions only. Questions about class content should be asked in person during office hours, lectures, discussions, or online on Piazza.

- Apply statistical methods to real-world problems.
- Understand the power and limitations of statistical methods.

Textbook & Software

Textbook: *Statistics for the Life Sciences*, Fifth Edition, by Samuels, Witmer, & Schaffner. Note that older versions will be fine and the textbook is recommended but not required.

Software: We will analyze data sets that require the use of statistical packages and do most calculations on the computer. We will use open-source software R. Instructions on how to download and install can be found on Canvas; see also https://cran.r-project.org/doc/manuals/R-intro.html.

Materials Covered

We will cover selected sections of the following material:

Data and Distributions	Chapter 1
Descriptive Statistics	Chapter 2
Probability	Chapter 3
The Normal Distribution	Chapter 4
Sampling Distribution	Chapter 5
Confidence Intervals	Chapter 6
Comparison of Two Independent Samples	Chapter 7
Comparison of Paired Samples	Chapter 8
Categorical Data	Chapter 9
Analysis of Categorical Data: Relationships	Chapter 10
Comparing the Means of Many Independent Samples	Chapter 11
Linear Regression and Correlation	Chapter 12

Homework, Quizzes, & Final Exam

Homework assignments in this course will involve tasks such as analyzing data using R, interpreting analysis results, and engaging in rigorous derivations. There will be a total of **five** weekly homework assignments, which will be made available on Wednesdays and will cover material from that particular week. The deadline for submission will be the following **Friday** (Wednesday for the last homework), and all submissions must be made electronically via Canvas by 11:59 pm on the due date. **Late submissions will not be accepted**. Please ensure that your submissions are in **PDF** format. You have the flexibility to compile your solutions using software like Word, LaTeX, R Markdown, or any other tool of your choice. For instance, you can write your solutions on paper, scan or take a picture of them, and convert them into a PDF file using Word. Each homework assignment is worth **10%** of the final grade, and **the lowest grade will be dropped** when calculating the final grade. To receive full credit, it is important to provide detailed steps for derivations and properly summarize any raw R output.

There will be two quizzes during the discussion in weeks 2 (**July 6**) and 4 (**July 20**). Each quiz will cover material that has been covered in lectures up to that day and accounts for **15%** of the final

grade.

The final exam will be comprehensive and will cover all the topics discussed throughout the course. The final exam will be conducted in person, and students are required to bring their own calculators. Notebooks and textbooks are not permitted during the exam. However, a formula sheet with relevant formulas and essential statistical tables will be provided. The final exam is scheduled for **Wednesday, August 2**, from 12:20 pm to 1:50 pm and will take place at **Teaching and Learning Complex 1010**.

Grading

The course grade is determined by the following components:

Homework	40% (10% each)
Quizzes	30% (15% each)
Final Exam	30%

Regrade Policy: You have **3 days** after a graded assignment is returned (exams, homework) to contest a grade. After this time, the request may not be considered.

Grade Scale

Final grades will be assigned according to the following scale:

A+	[97 – 100)	C	[73 – 77)
A	[93 – 97)	C–	[70 – 73)
A–	[90 – 93)	D+	[67 – 70)
B+	[87 – 90)	D	[63 – 67)
B	[83 – 87)	D–	[60 – 63)
B–	[80 – 83)	F	[0 – 60)
C+	[77 – 80)		

Communication

We will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. If you have any problems or feedback for the developers, email team@piazza.com. The instructor and TA will monitor the discussion board but will try to minimize their influence on the process. You can access Piazza in the navigation tab on Canvas or at https://piazza.com/ucdavis/summer2023/sta100a01a02ss12023/info. When you use Piazza:

- Use your official/preferred name at UC Davis. (Matched with your name in Canvas.)
- Be polite and respectful to others.
- Search before you post. Your question may have already been asked and answered.
- When you post a question, explain the context and give an example of what you mean.

The class will be using Canvas to distribute all resources and make announcements.

Code of Conduct

You are expected to strictly adhere to the UCD Code of Academic Conduct. Cheating, plagiarism, or other violations will not be tolerated; they will be referred immediately to Student Judicial Affairs, and necessitate a failing grade. It is very important that you familiarize yourself with the code of conduct: https://ossja.ucdavis.edu/code-academic-conduct.

Accomodations

UC Davis is committed to educational equity in the academic setting and serving a diverse student body. I encourage all students interested in learning more about the Student Disability Center (SDC) to contact them directly at https://sdc-portal.ucdavis.edu, sdc@ucdavis.edu or 530-752-3184. If you are a student who requires academic accommodations, send me your SDC letter of accommodation as soon as possible, within **the first week** of this course.

Important Items to Note

- Lectures will be recorded and made available on Canvas.
- **No late homework** will be accepted, as it is graded through Gradescope.
- You will need to have a calculator for this course. No graphing calculators allowed.
- You must show **all work** on homework and the final exam to receive full credit.
- For the two quizzes and the final exam, a formula sheet will be provided that contains relevant formulas and any necessary statistical tables.
- In case of any emergencies that hinder your ability to complete course exams or assignments, please email us with the subject line beginning with "**STA 100:**". We discourage the use of Canvas messages, as they may not receive a prompt response. Emergencies may refer to personal illness or accidents that affect either you or your family members.
- Collaboration on assignments is allowed and even encouraged among students, but every student is expected to submit their own original work. Any indication that the work submitted is not original, such as copying someone else's assignment or utilizing solutions available online, will result in the forfeiture of credit for that assignment. It is strictly prohibited to post homework to online assistance websites, including Yahoo Answers and Cramster, as these sites will be regularly monitored.
- **No make-up quizzes or early finals** will be given. Missing an exam without proper documentation of a personal illness or family emergency will result in a score of zero for that exam. Any documentation must be submitted to the instructor before the exam in question and at the student's earliest convenience. If a student misses the final due to a legitimate and documented reason and has at least a grade of D, an incomplete will be assigned, and the student will have to retake the final exam within the next three quarters.

Quarter Dates to Remember

Monday, June 26	Instruction Begins
Friday, June 30	10 Day Drop
Tuesday, July 4	Holiday - Independence Day
Thursday, July 6	Quiz I
Thursday, July 20	Quiz II
Tuesday, August 1	Last Day of Lecture
Wednesday, August 2	Final Exam

Disclaimer

This syllabus is subject to change at the discretion of the instructor in the event of extenuating circumstances or to improve the course.