STA 100: Applied Statistics for Biological Sciences
Summer Session I 2024
Department of Statistics, UC Davis

Instructor: Hang Zhou

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Office Hours: Tu 2 – 4 pm, Wen 2 – 3 pm
Course Website: https://hg-zh.github.io/teaching/STA100SS12024

Lecture Information

Dates: June 24th – Aug 2nd
Time: Mon/Tu/Wen 12:10 – 1:50 pm
Classroom: Wellman 234

TA and Discussion

Session	CRN	Time	Location	TA
A01	53365	Thu 12:10-1:50 pm	TLC 3218	Kwan Ho Lee
A02	53366	Thu 10:00-11:40 am	Wellman 212	Zhentao Li

TA for Session A01: Kwan Ho Lee
Email: ksjlee@ucdavis.edu
Office Hour: Mon 10:00am – 12:00pm
Classroom: MSB 1117 (the TA office)
TA for Session A02: Zhentao Li
Email: ztlli@ucdavis.edu
Office Hour: Mon 10:00am – 12:00pm
Classroom: MSB 1117 (the TA office)

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.

Prerequisite:

A grade of C- or better in either MAT 016B, MAT 017B or MAT 021B is required. A working knowledge of mathematical background of basic calculus is essential and will be assumed.

Software & Recommended Textbook:

- **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 R Project.
- **Recommended Textbook:** The class material will draw from the following textbook, but the class will be self-contained so no purchases are necessary.
  Statistics for the Life Sciences, Fifth Edition, by Samuels, Witmer, & Schaffner.

List of Topics:

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:

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 discussions in **weeks 3 (July 11)** and **4 (July 18)**. Each quiz will cover the material presented in lectures up to that date and **will account for 10% of the final grade.** Additionally, **there will be two bonus quizzes during the lectures in weeks 4 and 5, each worth an extra 5 points towards your 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. Please see the calculator rules at the end of this section. **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 Wed, July 31, from 12:10 pm to 1:50 pm and will take place at Wellman Hall 234 (Lecture classroom).**

Calculator policy:

- Bring your own calculator. You can't share with someone else.
- All non-graphing, non-programmable calculators will be allowed.
- Smart devices like cellphones, iPads, Macs, and PCs are not allowed.
- Models with wireless, Bluetooth, or cellular capability are not allowed.

Grading

The course final point grade is determined by the following components:

Homework	40% (10% each)
Quizzes in Discussions	20% (10% each)
Final Exam	40%
Extra Bonus (Quizzes in Lectures)	10 points (5 points each)

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.

Greade Scale

Final letter grades will be assigned according to the quantiles/percentiles/ranks/ of your final grade in points:

A+	$[95\% - 100\%]$	C	$[10\% - 15\%)$
A	$[85\% - 95\%)$	C−	$[5\% - 10\%)$
A−	$[75\% - 85\%)$	C− or F	$[0\% - 5\%)$
B+	$[55\% - 75\%)$		
B	$[35\% - 55\%)$		
B−	$[25\% - 35\%)$		
C+	$[15\% - 25\%)$		

The percentile in the above table is not your final points grade; it is the quantile of your final points grade among others. For example, if your final points grade is 92 and nobody has a higher grade than you, then your final points grade is in the 100% quantile and your final letter grade will be "A+". If you have a final points grade of 60% quantile, which means your final points grade is better than 60% of the students, your final letter grade will be "B+".

A student will receive an "F" if the following two conditions occur together:

- The quantile of your final points grade is lower than 5%.
- Your final points grade is lower than 60.

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. 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: UCD Code of Academic Conduct.

Accommodations

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 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.

Importants Dates:

Monday, June 24	Instruction Begins
Thursday, July 4	Holiday - Independence Day
Thursday, July 11	Quiz I
Thursday, July 18	Quiz II
Tuesday, July 30	Last Day of Lecture
Wednesday, July 31	Final Exam

Important Items to Note

- No late homework will be accepted
- 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 (except for single selection and true or false questions.)
- For the two quizzes and the final exam, a formula sheet will be provided that contains relevant formulas and any necessary statistical tables.
- Any email questions should be first addressed to the TA and referred to the instructor if necessary. Questions about class content should be asked in person during office hours, lectures, discussions, or online on Piazza.
- Using Chat-GPT is allowed and even encouraged among students, but you should be aware that the LLM generative AI may provide incorrect answers.
- Collaboration on assignments is allowed, 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 and the material I shared 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.