

Syllabus - Statsistics

STATS 8 syllabus - winter 2021

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(*instructional team contact info and office hours [here](#)*

(<https://canvas.eee.uci.edu/courses/33458/pages/contact-info-and-office-hours>.)

Class objectives

Objectives

My objective is to provide both an understanding of, and hands-on experience with basic, data-centric statistics. This class is similar to a regular statistics class except that we focus the application of statistics on examples of actual studies from a wide array of biological interests: from biomedical studies and pharmacology, to ecology, genetics, physiology and related socio-economic questions.

By the end of this course, you should be able to analyze and present data, design observational and experimental studies, use probabilities to model and predict random events, and use inference procedures to test hypotheses and estimate population parameters to reach conclusions in context. What you learn in this class should help you understand broadly the methodology, results, and issues of studies presented in your other classes or in news stories. I also hope that you will come to appreciate statistics as a cool and really interesting subject.

GE requirement

Note that STATS 8 satisfies the **General Education requirement for Category Va, Quantitative Literacy**, with the following learning outcome objectives: Students should be able to

- 1) Identify appropriate tools for quantitative analysis of processes or events.
- 2) Have a basic familiarity with fundamental principles underlying quantitative descriptions of natural or social processes.
- 3) Be able to do one or more of the following: evaluate studies and reports that assess risk and probability in everyday life; use models of natural phenomena to make quantitative predictions of future behavior or events; use models of economic and social structures to make quantitative predictions of future behavior or events.

Topics covered

1. Data collection: random samples, observational designs, experimental designs
2. Descriptive statistics: data organization, graphs, numerical summaries, interpretation in context
3. Association: correlation, regression, two-way tables, association versus causation
4. Probability concepts: fundamental rules, conditional probabilities, independence
5. Probability distributions: continuous distributions, Normal distributions, sampling distributions
6. Confidence interval for a population mean: one sample and matched-pairs
7. Hypothesis test for a population mean: one sample and matched-pairs
8. Inference for several means: two-sample t interval, two-sample t test, analysis of variance
9. Inference for categorical data: chi-square test for two-way tables and for goodness of fit, confidence interval for a population proportion

Class organization

Infographic (<https://canvas.eee.uci.edu/courses/33458/files/12398776/download?wrap=1>) of weekly topic organization

1. Self-paced learning: This class has a remote-learning format which starts with every student learning asynchronously from a set of short **interactive** videos hosted on Canvas. The interactive aspect of these videos is really important because humans do not learn particularly well just from watching. (See "[How to study for this class](https://canvas.eee.uci.edu/courses/33458/pages/how-to-study-for-this-class)" (<https://canvas.eee.uci.edu/courses/33458/pages/how-to-study-for-this-class>)). Be sure to watch all the videos in the set. (For those itching to move forward after just a couple of videos, consider that the videos in a set typically progress in complexity level.) *If you struggle on a particular topic, use the textbook explanation and examples for additional support at this stage.*

2. Coached training: You will need opportunities to practice your new analytical skills with expert guidance. The class offers live training with your TA (one weekly Zoom discussion section) and live individualized help during Zoom office hours with the instructor and TAs.

While live attendance is vastly preferable for learning, it may not be practical for everyone in these exceptional times. For this reason, attendance to the live events will not be mandatory (and not graded). If you must miss a discussion, know that an edited recording will be posted to Canvas within 24 hours of the Zoom event. In addition, instructor/peer help will be available asynchronously on the Canvas help forum.

3. Review and practice: Each topic will end with a recap video and a homework assignment on Sapling. Homework will provide additional statistical problems to solidify your skills with repeated practice. This is also a good time to complement your learning with the textbook explanation and examples, or to watch the how-to videos on Sapling about using statistical software for data analysis.

*This class will NOT require intense memorization sessions or cramming. This is all the work you will need to do weekly for our class. **HOWEVER**, if it looks like a lot of students are not taking the class activities seriously, the class organization and grading weights may be modified mid-quarter.*

Grading

Grades

Your overall grade in this class will be determined from the following mix of grades:

- **20% video quizzes** (one quiz per topic, on Canvas, average score of 2 attempts for each quiz)
- **10% try-it-out quizzes** (one quiz per topic, on Canvas, one attempt, with half credit for completion and half for correctness)
- **30% homework** (one assignment per topic, on Sapling, several attempts for each question with 10% penalty per repeat attempt of the question)
- **20% exam 1** (on GradeScope, during official lecture time on Tue of week 6, 02/09)
- **20% exam 2** (on GradeScope, during official lecture time on Thu of week 10, 03/11)

Exam 1 and exam 2 must be taken at their scheduled time.

Note that there is nothing scheduled for our course during finals week.

Beware that the course grading scheme may be modified during the quarter (including the need for an assessment during finals week) if an issue with overall lack of participation, widespread academic dishonesty, or disruptive extraneous circumstances were to emerge.

Getting a good grade requires sustained work throughout the quarter and is entirely your responsibility. **This class is not curved:** if everyone works hard, everyone should be able to get a good grade.

ONLY DOCUMENTED GRADING MISTAKES WILL BE CONSIDERED (no random regrades or point fishing requests). Letter grade pleading at the end of the quarter is unethical and not academically acceptable: such attempts will get no response.

Grade or submission issues

Contact our [Reader \(https://canvas.eee.uci.edu/courses/33458/pages/contact-info-and-office-hours\)](https://canvas.eee.uci.edu/courses/33458/pages/contact-info-and-office-hours) for ALL issues concerning due dates and grading.

- Be ready to provide documentation if you require an extension for a personal emergency.
- Submission extensions for non-emergency situations may be granted alongside a late-submission penalty (up to 50% depending on the lateness of the submission).
- Students who add late may request immediately due-date extensions on week-1 and week-2 assignments without incurring late-submission penalties.
- Except for the final assessment itself, **all grade issues must be raised BEFORE finals week.**

For complex, long-term issues (such as regular military training or hospitalization), contact Dr. Baldi to make appropriate alternate arrangements in-person on Zoom.

***** Academic Integrity *****

The UCI policy on academic integrity can be found at aisc.uci.edu ↗ (<https://aisc.uci.edu/>).

Grades are an assessment of a student's accomplished learning. Therefore, ALL student work in this class must be the work of the individual receiving credit. Academic dishonesty includes having someone else do graded work for you (an entire assignment or parts of it) or any activity in which you represent someone else's work as your own. It also includes you doing this for someone else. *Study groups and group work for group submissions do not fall under the category of academic dishonesty and provide instead an excellent learning opportunity.*

All acts of academic dishonesty will be officially reported to AICS for possible academic sanctions AND will result in an F in the course without option to drop.

Learning, research, and scholarship depend upon an environment of academic integrity and honesty. This environment can be maintained only when all participants recognize the importance of upholding the highest ethical standards.

NOTE: All materials provided by your instructor are the sole copyright property of that instructor. This content is protected and may not be shared, uploaded, or distributed without express written consent. Passing any original course material as your "own notes" is an act of plagiarism and intellectual property theft.

Netiquette and privacy considerations

Netiquette

In all online interactions, we expect a positive attitude and respectful behavior. Be kind, understanding, and helpful with everyone. Thank you :-)

Privacy considerations

Understand that live Zoom discussion sections will be recorded and that some edited parts will be posted to Canvas for review.

Please know that you do have options if you have privacy concerns over these recordings: You may change how your name appears on screen, use a non-identifying image for your Zoom profile, disable/cover your camera. You may even opt not to attend Zoom discussions; this is not ideal pedagogically, but know that there will not be any associated grade penalty.


Note that exam 1 and exam 2 will be proctored on Zoom, but the recording will not be posted online. Please reach out early in the quarter if your situation prevents you from sharing any information in such a manner, so that we have time to figure out an alternative proctoring method.

Course requirements

Sapling, an online textbook and homework system

We will use an online textbook-homework system called "Sapling Statistics for The Practice of Statistics in the Life Sciences, 4th edition" (PSLS4e) that contains the e-textbook, statistical software, graded assignments, and many useful resources. *Detailed information about Sapling can be found [here](https://canvas.eee.uci.edu/courses/33458/pages/sapling-info) (<https://canvas.eee.uci.edu/courses/33458/pages/sapling-info>).*

Equipment

You will need a computing device (such as a desktop, laptop, or tablet) and stable internet access to watch the course videos, take the online assignments, and do your online homework. Check out the UCI TechPrep website (<https://techprep.oit.uci.edu/learning/> ) for help figuring out your technology setup this quarter.





Video/microphone equipment and a quiet place would be great but not necessary for interactions during live Zoom sessions.

The ability to show yourself on video will be required for the live, Zoom-proctored exams. You could borrow a webcam or use your cell-phone camera for these two events.

For the statistical computations needed in this class, you may use any software of your choice. We will routinely use the free, web-browser-based statistical software CrunchIt! (no installation needed). It will be needed for work on the final exam.

Wellbeing

We should always take care of our physical and mental wellbeing first and foremost. It may be particularly true in these globally challenging times. Here some resources.

- UCI Be Well portal: <https://bewell.uci.edu/>  (<https://bewell.uci.edu/>)
- UCI counseling center for free counseling to students (no health insurance required): <https://counseling.uci.edu/>  (<https://counseling.uci.edu/>)
- Where to turn for help at UCI: <http://home.due.uci.edu/news/overview-of-the-ovptl-and-due-knowing-where-to-turn-for-help/>  (<http://home.due.uci.edu/news/overview-of-the-ovptl-and-due-knowing-where-to-turn-for-help/>)
- Division of Undergraduate Education (DUE) Resources and Support: <http://home.due.uci.edu/news/taking-advantage-of-division-of-undergraduate-education-due-resources-and-support/>  (<http://home.due.uci.edu/news/taking-advantage-of-division-of-undergraduate-education-due-resources-and-support/>)
- UCI Disability Services: <https://dsc.uci.edu/>  (<https://dsc.uci.edu/>)
- How to Apply to Supplemental Nutrition Assistance Program (SNAP): [Youtube video](https://www.youtube.com/watch?v=e0X2oeP9PIA)  (<https://www.youtube.com/watch?v=e0X2oeP9PIA>)