

Short syllabus

STATS 7 preliminary short syllabus - fall 2021

This is meant to help students decide whether the course fits their schedule and academic needs. A full syllabus will be available with the rest of the Canvas course shortly before the quarter starts.

To accommodate UCI and XCampus students who may not be able to attend classes in-person, Stats 7 will be offered online for fall quarter 2021. Lectures will be asynchronous (using interactive videos and supported with live online office hours) and discussions will be offered live online (with the ability to attend any of the 8 discussion times offered, for added convenience). Quizzes and exams (details soon before start of quarter) will also be taken online.

Class objectives

Objectives

My objective is to provide both an understanding of, and hands-on experience with basic, data-centric statistics. I will use for illustration examples of actual studies from a wide array of socioeconomic and scientific fields. What you will 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.

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. I also hope that you will come to appreciate statistics as a cool and really interesting subject.

GE requirement

Note that STATS 7 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, confidence interval for a population proportion

Class 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.

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). Because live participation is vastly preferable for learning, work done during discussion will be used for participation points. To provide flexibility and facilitate attendance, students will be allowed to attend any one of the 8 discussion times listed on WebSOC for Stats 7 LecA and Lec B (even if that isn't the one they are registered for) -- as long as attendance across the 8 sections doesn't get too unbalanced.

3. Review and practice: Each topic has assignments to help you solidify your skills with repeated practice. This is also a good time to complement your learning with the textbook explanations and examples, and to seek help either live on Zoom during the instructor's or the TAs' office hours or asynchronously on the Canvas help forum.