Syllabus for STAT 630: Statistical Methods
Fall 2020

Instructor: Dr. Eric Fox
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Lecture:

Section 1	Tu/Th 1:15 – 2:55PM online using Zoom
Section 2	Tu/Th 6:00 – 7:40PM online using Zoom

Office Hours: Tu/Th 4:30-5:45 and Wed 1-3, or by appointment.
Zoom link: `https://csueb.zoom.us/j/502694714`

Website: Course materials will be posted on Blackboard.

Textbooks: Diez, D., Barr, C. and Cetinkaya-Rundel M. *OpenIntro Statistics*, 4th Edition, 2019. [Free PDF: `https://www.openintro.org/stat/textbook.php`]

Chihara, L. and Hesterberg T. *Mathematical Statistics with Resampling and R*. 2nd Edition, 2018. [Free electronic version: `http://library.csueastbay.edu/home`]

Software:
R, can be downloaded here `https://www.r-project.org/`
RStudio, can be downloaded here `https://www.rstudio.com/`

Course Topics: This course will provide a graduate-level introduction to statistical methods and data science. Topics include exploratory data analysis, statistical inference, and linear regression. Weekly computer labs will provide training in the use of the statistical programming language R.

- Data collection: sampling designs and experimental studies
- Descriptive statistics and data visualization
- Probability distributions (normal, t, binomial, Chi-square)
- Sampling distributions
- Central Limit Theorem

- Confidence intervals
- Hypothesis testing
- Resampling methods (the bootstrap)
- Chi-square tests for goodness-of-fit and independence
- Simple linear regression and correlation
- Simple logistic regression*
- Analyzing date-time and spatial data*

* indicates optional topics

Grading: There will be weekly homework assignments, and three take-home exams. Both the homework and exams will be a combination of conceptual and data analysis problems. The data analysis problems will require the use of R.

- 40% Homework
- 60% Three Exams (20% each)

Policy on Late Assignments and Exams: Late homework will generally not be accepted. However, your lowest **two** scoring homework assignments will be dropped. I may agree to extensions on due dates if you are experiencing an emergency or illness.

Student Learning Outcomes: Upon successful completion of this course, students should be able to:

- Apply statistical methodologies, including (a) summary statistics and graphical displays, (b) hypothesis testing and confidence intervals, and (c) linear regression and correlation.
- Derive and understand basic theory underlying these methodologies.
- Use R and RStudio to analyze data sets and implement statistical methods.
- Understand basic R programming, including vectors and data frames, subsetting, looping and control structures, simulation and resampling techniques.
- Communicate statistical concepts clearly and appropriately to others.

Technology Requirements: This course will use the web conferencing software Zoom. To participate you will need a stable internet connection, and a laptop or desktop computer equipped with a webcam, microphone, and speakers. Please refer to the Zoom system requirements here.

Course Policies and Zoom Etiquette:

- All lectures will be delivered live during the scheduled class time, and attendance is highly recommended. Recordings of the sessions will be posted on Blackboard for students that cannot attend or have connectivity issues.
- Make sure that your audio is muted upon entry into the class.
- You may ask questions by using the chat function or by unmuting yourself. Please try to not disrupt the instructor or other students.

Common Syllabus Items: Items such as policies on academic dishonesty, disability, and handling emergency situations can be found under "University Policies" on Blackboard.