Syllabus for STAT 630: Statistical Methods
Section 1, Fall 2021

Instructor: Dr. Eric Fox
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Lecture:

- Tuesday 3:15 - 4:55 at South Science 205
- Thursday 3:15 - 4:55 at South Science 146

Office Hours (in-person): Tu/Th 5-5:30 at N. Science 303A, or by appointment

Office Hours (online): M/W 3:30-5:30, or by appointment
Zoom link: https://csueb.zoom.us/j/502694714

Website: Course materials will be posted on Blackboard.

Textbook: Diez, D., Barr, C. and Cetinkaya-Rundel M. *OpenIntro Statistics*, 4th Edition, 2019. [Free PDF: https://www.openintro.org/book/os/]

Additional Reference: 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

- Sampling distributions and the Central Limit Theorem
- Confidence intervals and hypothesis testing
- Resampling methods (the bootstrap, permutation tests)
- Chi-square tests for goodness-of-fit and independence
- Simple linear regression and correlation
- Analyzing date-time and spatial data

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.

- 25% Homework
- 75% Three Exams (25% each)

Policy on Late Assignments and Exams: Late homework will generally not be accepted. However, your lowest 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.

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

A Note on Discrimination, Harassment, and Retaliation (DHR):
California State University East Bay is committed to a community free from sexual assault and violence. Title IX and CSU policy prohibit discrimination, harassment and retaliation, including Sex Discrimination, Sexual Harassment or Sexual Violence. CSUEB encourages anyone experiencing such behavior to report their concerns immediately. CSUEB has both confidential and non-confidential resources and reporting options available to you. **As a faculty member, I am required to report all incidents and thus cannot promise confidentiality.** I must provide our Title IX coordinator and or the DHR Administrator with relevant details such as the names of those involved in an incident. For confidential services, contact the **Confidential Advocate at 510-885-3700** or go to the Student Health and Counseling Center. For 24-hour crisis services call the Bay Area Women Against Rape (BAWAR) hotline at 510-845-7273. For more information about policies and resources or reporting options, please visit the following websites: https://www.csueastbay.edu/diversity/title-ix/