Syllabus for STAT 321: Probability Through Simulation

Spring 2024 (3 units)

Instructor: Eric Fox
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Lecture: Tues/Thurs 11-12:15 at North Science 206

Office Hours: Tues/Thurs 1-2 at North Science 303A, or by appointment

Website: Course materials will be posted on Canvas.

Textbook: There is no required textbook. The following references are available for free on the internet:

- Darrin Speegle and Bryan Chair. *Probability, Statistics and Data: A Fresh Approach Using R*. CRC Press, 2022.
  Online version: `https://mathstat.slu.edu/~speegle/_book/preface.html`
- Diez, D., Barr, C. and Cetinkaya-Rundel M. *OpenIntro Statistics*, 4th Edition, 2019. (PDF version posted on Canvas)

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

Course Topics:

- Sample space and events, axioms of probability
- Conditional probability and independence, Bayes' rule
- Discrete random variables (binomial, geometric, Poisson)
- Continuous random variables (normal, uniform)
- Expectation and variance
- Probability simulations using R
- Law of Large Numbers and the Central Limit Theorem

Grading:

- 25% Computer labs
- 75% Three exams (25% each)

Homework will be assigned but not collected. Exams may be have both in-class and take-home components.

Policy on Late Assignments: Late assignments will either receive a point deduction or not be accepted. I may agree to extensions on due dates if you are experiencing an emergency or illness.

Attendance Policy: Students are required to attend class on campus during the scheduled times and participate in class activities.

Important Dates:

- First day of classes: Tuesday, January 16
- Last day to drop: Monday, January 29
- Spring break: April 1-5
- Last day to withdraw: Friday, April 14
- Last day of classes: Friday, May 3

A complete list of important dates:
`https://www.csueastbay.edu/registrar/important-dates/spring-2024.html`

Student Learning Outcomes: Upon successful completion, this course will provide students with an introduction to

- Fundamental concepts in probability: sample space and events, axioms, random variables, conditional probability, independence, expectation and variance.
- Various discrete and continuous probability distributions.
- Using simulations to estimate probabilities, and to gain understanding of the Central Limit Theorem and Law of Large Numbers.
- Applications of probability to a variety of fields (e.g., social and health sciences, ecology, engineering).

Common Syllabus Items: Items such as policies on academic integrity, disability, handling emergency situations, and protection against discrimination, harassment, and retaliation can be found under "University Policies" on Canvas.

Student Services: To access student services offered at Cal State East Bay, click on the My-Compass icon to get you to your one-stop online student support hub for information on academic advising, tutoring, financial aid, the library, the health center, technology support, career counseling, campus life, equity programs, and more.

Grade Appeal and Academic Grievanes: If you wish to appeal your course grade at the end of the semester or have other academic concerns related to a course, please visit the Grade Appeals and Academic Grievances (GAAG) section of the catalog, which explains the process.