PSTAT 115: Introduction to Bayesian Data Analysis

Fall 2020

Instructor:	Alexander Franks	**Time:**	M/W 11:00-12:15
Email:	afranks@pstat.ucsb.edu		

Course Pages:

- Link to live lecture: https://ucsb.zoom.us/j/86937803425?pwd=cnNnOUhZWUlkc2ZvN3JWUENiWGVmUT09

- Link to section / office hours: https://ucsb.zoom.us/j/87510865800?pwd=S1FUbUNKYnJOWmFBbHRvRU1sSDZYZz09

- Gauchospace: https://gauchospace.ucsb.edu/courses/mod/forum/view.php?id=4471455

- Piazza: piazza.com/ucsb/fall2020/pstat115

- pstat115.lsit.ucsb.edu: Use https://bit.ly/32cO6dm to sync new assignments and labs.

    - Bookmark this link, you will use it alot!

Office Hours:
Professor Franks: afranks@pstat.ucsb.edu Office Hours, Wednesday 2pm
Xubo Liu xubo@ucsb.edu: Office Hours TBD
Dorothy Li dorothyli@pstat.ucsb.edu: Office Hours TBD

Course Texts

- **Required:** Peter Hoff *A First Course in Bayesian Statistical Methods*; https://www.springer.com/us/book/9780387922997). (pdf available on the course website)

- Optional: Jim Albert *Bayesian Computation with R*; https://www.springer.com/us/book/9780387922973).

- Optional: Richard McElreath *Statistical Rethinking*; https://xcelab.net/rm/statistical-rethinking/).

- Optional: Andrew Gelman, John Carlin et al. *Bayesian Data Analysis*; http://www.stat.columbia.edu/~gelman/book/).

Objectives:

At the end of the course, a successful student will be able to:

- build and refine statistical models using the Bayesian paradigm

- utilize Monte Carlo methods for statistical inference

Prerequisites: PSTAT 120 A-B (probability and math-stat) and 126 (regression). Familiarity with R is required.

Tentative Course Topics:

> Review of frequentist inference
> One parameter models
> Monte Carlo computation
> The normal model
> Markov chain Monte Carlo
> Hierarchical models

Grading Policy:

- Homework (30%).

  - There will be approximately 6 homeworks, due roughly every week on Sundays at midnight.

  - You are allowed to work with a partner. You need only turn in one homework per pair. If you need help finding a partner, start with the "Search for Teammates" tool on Piazza. Homework solutions must be done in RMarkdown and turned in on Gradescope. Each homework assignment will be given as a template that you should work from.

  - All code must be written to be reproducible in Rmarkdown
  - All derivations can be done in any format of your choosing (latex, written by hand) but must be legible and *must be incorporated into your final pdf.*
  - All files must be zipped together and submitted to Gradescope
  - Ask a TA *early* if you have problems regarding submissions.
  - Homework not submitted online before the deadline will be considered late (10 point deduction). 24 hours after the deadline homework will not be accepted and no credit will be awarded. Do not wait until the night before it is due to start working!

- Midterm exam (20%). **Take home, due November 9, 2020** .

- 10% quizzes

  - Approximately 5 in quizzes (online), lowest dropped
  - There is no make-up for missed quizzes.

- Section attendance (10%)

  - Section attendance is required and essential. Your attendance will be noted.

- Final exam (30%). **Take home, due Monday December 16, 2020**

Homeworks:

- All files will be submitted electronically via Gradescope

- Submit a zip file containing:

  1. R markdown code (.Rmd file, template provided)

  2. Any additional files as needed

  3. Generated PDF file

Important Dates:

Midterm	November 9, 2020 (take home)
Final Exam	December 16, 2020 (take home)

Course Policies:

- Please sign up for Piazza: piazza.com/ucsb/fall2020/pstat115. All questions related to course content, homework, R programming and quizzes should be done on Piazza. *Only questions pertaining to grades or personal issues should be handled over email.*

- Regular attendance is strongly encouraged and can count toward you participationg grade!