

# PSTAT 115: INTRODUCTION TO BAYESIAN DATA ANALYSIS

Spring 2023

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<b>Instructor:</b>	Rodrigo Targino	<b>Time:</b>	T/R 9:30-10:45
<b>Email:</b>	<a href="mailto:rodrigotargino@ucsb.edu">rodrigotargino@ucsb.edu</a>		

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## Course Pages:

- Location: [HSSB 1174](#)
- Gauchospace: [link](#)
- Nectir: [link](#). We ask that when you have a question about the class that might be relevant to other students, post it on Nectir instead of emailing us. That way, all the staff can be on the same page and everyone can benefit from the response. Click on the Nectir link on Gaucho to be automatically added to the class channel. If you don't have an account already, to please make one at [ucsb.nectir.io](https://ucsb.nectir.io).
- JupyterHub: [link](#). All your work should be completed here. Use this to sync new assignments and labs.
  - **Bookmark this link, you will use it a lot!**
- GradeScope: [link](#). Weekly homework assignments are a required part of the course.

## Office Hours:

Professor Targino [rodrigotargino@ucsb.edu](mailto:rodrigotargino@ucsb.edu): Office Hours, Wednesdays 4.45-5.45pm at OG1203 and on Zoom <https://fgv-br.zoom.us/j/97377443266>

[TA] Gabrielle Salo [gsalo@umail.ucsb.edu](mailto:gsalo@umail.ucsb.edu): Office Hours, Tuesdays from 3-4pm at <https://ucsb.zoom.us/j/83407131759>

[TA] Lauren ughes [laurenughes@ucsb.edu](mailto:laurenughes@ucsb.edu): Office Hours, Mondays 10am-12pm at SH5421

[ULA] Cyril Wang [cyrilwang@umail.ucsb.edu](mailto:cyrilwang@umail.ucsb.edu): Tuesdays from 11am-1pm on Zoom <https://ucsb.zoom.us/j/9306692287>

[ULA] Chunting Zheng [chunting@umail.ucsb.edu](mailto:chunting@umail.ucsb.edu): Tue: 3pm - 5pm, Wed: 4pm - 6pm, Fri: 9am - 11am <https://ucsb.zoom.us/j/2096363969>

## Course Texts

- **Required:** Alicia A. Johnson, Miles Q. Ott, Mine Dogucu *Bayes Rules* <https://www.bayesrulesbook.com/>
- Optional: Peter Hoff *A First Course in Bayesian Statistical Methods*; <https://www.springer.com/us/book/9780387922997>.
- 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
- An introduction to probabilistic programming

**Grading Policy:**

- Homework (35%).
  - There will be approximately 4 homeworks, due roughly every week on Fridays at midnight.
  - 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*.
  - 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%). **In person, May 9th 2023 .**
- Quizzes (15%)
  - Approximately 5 quizzes (online), lowest dropped
  - There is no make-up for missed quizzes.
  - Section attendance is an important part of the course.
- Final exam (30%). **In person, June 13th 2023**

## Tentative course schedule

Tue	04/Apr/23				
Wed	05/Apr/23			Wed	10/May/23
Thr	06/Apr/23	HW1 out		Thr	11/May/23
Fri	07/Apr/23			Fri	12/May/23
Sat	08/Apr/23			Sat	13/May/23
Sun	09/Apr/23			Sun	14/May/23
Mon	10/Apr/23			Mon	15/May/23
Tue	11/Apr/23			Tue	16/May/23
Wed	12/Apr/23			Wed	17/May/23
Thr	13/Apr/23			Thr	18/May/23
Fri	14/Apr/23	HW1 due		Fri	19/May/23
Sat	15/Apr/23			Sat	20/May/23
Sun	16/Apr/23			Sun	21/May/23
Mon	17/Apr/23			Mon	22/May/23
Tue	18/Apr/23			Tue	23/May/23
Wed	19/Apr/23			Wed	24/May/23
Thr	20/Apr/23	HW2 out		Thr	25/May/23
Fri	21/Apr/23			Fri	26/May/23
Sat	22/Apr/23			Sat	27/May/23
Sun	23/Apr/23			Sun	28/May/23
Mon	24/Apr/23			Mon	29/May/23
Tue	25/Apr/23			Tue	30/May/23
Wed	26/Apr/23			Wed	31/May/23
Thr	27/Apr/23			Thr	01/Jun/23
Fri	28/Apr/23	HW2 due		Fri	02/Jun/23
Sat	29/Apr/23			Sat	03/Jun/23
Sun	30/Apr/23			Sun	04/Jun/23
Mon	01/May/23			Mon	05/Jun/23
Tue	02/May/23			Tue	06/Jun/23
Wed	03/May/23			Wed	07/Jun/23
Thr	04/May/23			Thr	08/Jun/23
Fri	05/May/23			Fri	09/Jun/23
Sat	06/May/23			Sat	10/Jun/23
Sun	07/May/23			Sun	11/Jun/23
Mon	08/May/23			Mon	12/Jun/23
Tue	09/May/23	MIDTERM		Tue	13/Jun/23
					FINAL

**Course Policies:**

- Learning Cooperatively
  - We encourage you to discuss all of the course activities with your friends and classmates as you are working on them.
  - You will definitely learn more in this class if you work with others than if you do not. Ask questions, answer questions, and share ideas liberally.
- Academic Honesty
  - Cooperation has a limit.
  - You should not share your code or answers directly with other students.
  - Doing so doesn't help them; it just sets them up for trouble on exams.
  - Feel free to discuss the problems with others beforehand, but not the solutions.
  - Please complete your own work and keep it to yourself.
  - Penalties for cheating are severe — they range from a zero grade for the assignment up to dismissal from the University, for a second offense.
  - Rather than copying someone else's work, ask for help. You are not alone in this course! We are here to help you succeed. If you invest the time to learn the material and complete the projects, you won't need to copy any answers.
- Copyright of Course Materials
  - Most of the material for this course was prepared by Professor Alex Franks.
  - The lectures and course materials, including PowerPoint presentations, tests, outlines, and similar materials, are protected by U.S. copyright law and by University policy.
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