

PSTAT 126: Regression Analysis

Summer 2023

Course Policies and Syllabus

Course website: <https://ucsb.instructure.com/courses/13351>

Instructor: Laura Baracaldo

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Office Hours: Wed 1:45-2:45pm. Old Gym 1201.

TA: Moya Xiong

Email: moyaxiong@pstat.ucsb.edu

Office Hours: TBD

Lecture: MTWR 12:30- 1:35 BRDA 1640

	Section #	Days	Time	Location	TA
Sections:	15339	M W	9:00- 9:50 am	PHELP 1513	Moya Xiong
	15347	MW	10:00-10:50 am	PHELP 1513	Moya Xiong

Course Topics and Objectives:

This course introduces the theory and application of linear regression models. We will give a (non-exhaustive) introduction to linear models in an increasing order of complexity throughout this quarter. Topics may include simple and multiple regression models; estimation; inference; prediction; regression diagnostics; model selection; shrinkage methods; analysis of variance, and more if time allows. The course will be focused on the learning of computer package R to solve real-world problems.

Upon completion of this course, a student should be able to:

- Explain the common regression techniques conceptually and characterize some of them mathematically;
- Describe and discuss the concepts, use cases, and properties of the linear model and many of its extensions;

- Be able to effectively use R for exploratory data analysis, model fitting, and visualization.

Course Material:

- Lecture slides and labs will be available on *Canvas*. All the course material will be weekly posted in the *Modules* section as the quarter progresses.
- Homework assignments and quizzes will also be given out on *Canvas*, and should be turned in on *Gradescope*. Other forms of submission will not be accepted.
- All Q&A related to course content, homework assignments, R programming, and quizzes should be done on Nectir.

Prerequisites: PSTAT 10 and PSTAT 120B both with a minimum grade of C or better. This course heavily depends on matrix algebra (MATH 4A). Some familiarity with R is expected.

References: The lecture slides are self-contained. You may find the following textbooks helpful:

- Faraway, J. J. (2005), *Linear Models with R*, Chapman & Hall.
- Weisberg, S. (2005), *Applied Linear Regression*, 3rd edition, Wiley.

R programming

We will heavily use the R programming language (www.r-project.org) throughout this course. Please set up your R environment, if you have not, as early as possible.

Reading the following book (which is freely available online) is very helpful for quickly coming up to speed with R.

- *R for Data Science* by Golemund and Wickham (available at: <https://r4ds.had.co.nz/index.html>)

Course Grading:

- **Homework** (40%).

- There will be 4 homework assignments, due approximately every 2 weeks. Each assignment will be worth the same amount.
 - **Homework solutions must be done using RMarkdown and turned in on Gradescope.** All code should be well documented. We have provided a homework template that you can use to get started. **You MUST submit the R Markdown code (Rmd file, template provided), the PDF generated and any additional file as needed.**
 - Homework not submitted online before the deadline will be considered late (20% deduction from the received assignment credit). 24 hours after the deadline homework will not be accepted and no credit will be awarded. Since internet service can be unreliable, you are encouraged to start and submit your assignments well in advance of the deadline.
 - **You may not copy or make use of solutions from the web, other students, or other sources.**
- **Quizzes (20%).**
 - There will be occasional quizzes given on Canvas. Each quiz will be worth the same amount.
 - There is no make-up for missed quizzes.
 - **Final exam(40%).**

Code of Academic Integrity

It is expected that you will adhere to the UCSB *Student Conduct Code* at <http://studentconduct.sa.ucsb.edu/academic-integrity>. In quizzes, homework assignments, and final project, you may not copy or make use of solutions from the web, other (groups of) students, or other sources.

The course materials, including lecture slides, lecture recordings, quizzes, homework assignments, and similar materials, are protected by U.S. copyright law and by University policy. You may take notes and make copies of course materials for your own use. You may also share those materials with another student who is enrolled in or auditing this course. Do not reproduce, distribute or display (post/upload) course materials in any other way – whether or not a fee is charged – without the express prior written consent from the lecturer. To do so will result in a UCSB Honor Code investigation.

Grade Appeals

Grade appeals must be made to your TA, in writing, no sooner than 24 hours after the assignment or exam is returned, and no later than 4 days after it is returned. Please provide written justification for your appeal and include the homework or exam in question, along with any relevant supplementary information.

If you have a dispute with your TA over a grade you have received, you have the right to request a review by the professor. Please keep in mind, however, that an appeal will invoke a review of the full assignment and could result in an even lower grade.

COVID-19 Health and Safety Requirement

Follow the policies and requirements listed at <https://www.ucsb.edu/COVID-19-information>. Non-compliance with COVID-19 health and safety requirements is a violation of the UCSB Student Code of Conduct.

Links for Campus Resources

- Office of Ombuds <https://ombuds.ucsb.edu> provides confidential consultation services to faculty, staff, students, parents, or anyone else with a campus-related concern.
- DSP. <https://dsp.ext-prod.sa.ucsb.edu>. Students that will need special assistance must contact me as soon as possible and have their Disabled Student Program Specialist send me a formal request.