

# ECON 178: Economic and Business Forecasting, Winter 2022

Professor Ying Zhu

- **Disclaimer.** The following information reflects the official schedule of classes as of February 8, 2022. Due to the uncertainty from the Covid-19 pandemic, some of the organizational details on the syllabus may change. Please make sure you check Canvas and the syllabus regularly for updates.
- **Assigned lecture sections.** Section A: TuTh 12:30pm - 1:50pm. Section B: TuTh 2:00pm - 3:20pm. Remote only mode throughout the quarter (via ZOOM).
- **Assigned discussion sections.** Section A: W 5:00pm - 5:50pm. Section B: F 5:00pm - 5:50pm. Remote only mode throughout the quarter (via ZOOM).
- **Instructor.** Ying Zhu; Email: yiz012@ucsd.edu.
- **Teaching assistants.**
  - Connor Goldstick (cgoldsti@ucsd.edu). Office hours: W 10:00am - 11:00am (on ZOOM).
  - Haitian Xie (hax082@ucsd.edu). Office hours: Th 4:00pm - 5:00pm (on ZOOM).
- **Reader.**
  - Davide Viviano (dviviano@ucsd.edu).

## Organization

- My pre-recorded lectures will be posted on Canvas. In the assigned lecture sections, I will select a subset of topics from my pre-recorded video lectures and go through them again. In other words, the materials I go through in the assigned lecture sections are covered in my pre-recorded video lectures. Your attendance is not required. Interactions are encouraged in the assigned lecture sections.
- In the assigned lecture sections, I will also answer questions about the course. For example, you might have questions about my pre-recorded lectures and want to discuss with me during the assigned lecture sections.
- The assigned lecture sections will not be recorded.
- While in the remote mode period, my TAs will hold the discussion sections in a synchronized fashion (your attendance is not required). These discussion sections will be recorded and uploaded on Canvas. Note this only applies to the remote mode period. Please check Canvas and the syllabus regularly for updates.
- Problem sets and solutions, as well as final project assignment will also be posted on Canvas.

- Invitations links for ZOOM will be posted on Canvas.
- Answering questions related to the course material via email can be difficult, especially when equations and/or code are involved. Please only email us questions on course policies.
- Please include ECON178 in the subject line of your email.

My lectures and course materials, including pre-recorded video lectures, outlines, and similar materials, are protected by U.S. copyright law and by University policy. I am the exclusive owner of the copyright in those materials I create. 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. You may not reproduce, distribute or display (post/upload) lecture notes or recordings or course materials in any other way — whether or not a fee is charged — without my express prior written consent. You also may not allow others to do so. If you do so, you may be subject to student conduct proceedings under the UC San Diego Student Code of Conduct. Similarly, you own the copyright in your original papers and exam essays. If I am interested in posting your answers or papers on the course web site, I will ask for your written permission.

## Course Description

This course provides an introduction to a number of statistical learning methods, including stepwise selection, ridge regression, the Lasso, logistic regressions and nearest neighborhood. We will discuss the basic concepts and computational issues behind these methods, the concepts of prediction, as well as applications in economics and business.

## Textbook and Other Course Materials

- Required: *An Introduction to Statistical Learning with Applications in R*. 7th edition. Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. Springer, 2013.  
— (<https://statlearning.com/>)
- My lecture notes (motivations, concepts, methods, theory, computational issues)
- Discussion notes (reviewing lectures, demonstrations in R)<sup>1</sup>

## Prerequisites

ECON 120C

## Software

This course is heavily based on the statistical software R. Each problem set will include empirical questions based on real data sets. To answer the empirical questions, you will need to use R. **Your teaching assistants will run tutorials on R and explain the necessary commands needed to complete the problem sets. This will be a good opportunity for you to be familiar with this software and see how it works in practice.**

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<sup>1</sup>Thank to Connor Goldstick and Davide Viviano who have prepared these notes.

## Course Outline

1. Motivation and basic concepts of statistical learning
2. Review of the linear regression model and least squares estimator
3. Ridge regression and the Bayesian interpretation
4. Feature selection: best subset selection, stepwise selection, the Lasso
5. Generalized additive models
6. Classification: logistic regressions and nearest neighborhood

## Grades

1. Bi/tri-weekly problem sets – 45%. The problem sets will include both conceptual and applied questions. The purpose of the problem sets is to help you learn the material and assess your progress.
2. A final project – 55%. You will be provided with a data set and guidelines that help you to work through the project.
3. Bonus opportunity – 5%. Competition for top predictors (to be discussed in the pre-recorded video lectures as well as assigned lecture sections).

**Late problem sets will not be accepted except with my prior consent or in unusual circumstances permitted by University policies.** Normally, I consider the syllabus my contract with the class. However, some flexibility might be desirable in this quarter due to all of the uncertainty related to the pandemic. My current prediction of how I will assess your performance in this course is stated above. While I will do what I can to keep to the predicted assessments for this course, the evolving situation may make it necessary for me to make changes. If that happens, I will make sure to inform you as early as possible, and to explain as best as I can the rationale behind the change.

## Academic Dishonesty

Academic dishonesty will be dealt with according to the University policies.

Please see <https://academicintegrity.ucsd.edu/>. Cheating includes, but is **not limited to**: copying someone else's assignments, stealing someone else's assignments, asking someone else to do your assignments, etc. Using program code written by someone else (**except those explicitly provided by the course staff members**) or giving code to someone else is considered violation of academic integrity. You may cite materials from the textbook, my lecture notes, and the TAs' discussion notes to help answer the questions on the assignments. Whenever you use materials outside the textbook and the course materials, you have to provide references (remember that information online could be incorrect and/or misleading).

- **You are allowed to discuss \*Bi/tri-weekly problem sets\*. However, each of you must write your OWN versions of program code and hand in your OWN versions of the answers.**

- You are not allowed to work together with others on the final project and the bonus opportunity; you are not allowed to get any help (including but not limited to program code) from others (except the ECON178 WI22 instructor, teaching assistants and reader) on the final project and the bonus opportunity.

We will use tools to catch any form of plagiarism and cheating. **Penalties on cheating include, among others, a failing grade for the course. In addition, the Council of Deans of Student Affairs will impose a disciplinary penalty.**

Every student in ECON178 must read, understand, agree and sign the integrity pledge (<https://academicintegrity.ucsd.edu/forms/form-pledge.html>) before completing any assignment for ECON178. After you sign the pledge form, a receipt will be emailed to you. Please include this receipt in the submission of your assignment.

### Accommodation for Students with Disabilities

If you have a documented disability, please provide your documentation in advance so that accommodations may be arranged. If you believe that you have a disability and desire accommodation, please register with the Office for Students with Disabilities. University-wide resources can be found at <https://students.ucsd.edu/well-being/disability-services/index.html>.

### Information for Basic Needs Services

- Basic Needs (<https://basicneeds.ucsd.edu/>): Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their academic performance, is encouraged to contact: [foodpantry@ucsd.edu](mailto:foodpantry@ucsd.edu), [basicneeds@ucsd.edu](mailto:basicneeds@ucsd.edu), or call 858-246-2632.
- Triton Food Pantry (<https://basicneeds.ucsd.edu/food-security/pantry/index.html>) is an emergency food relief program to provide food for students and fight food insecurity. You can get canned food, pasta, beans, and rice as well as fruit and vegetables at the pantry. [foodpantry@ucsd.edu](mailto:foodpantry@ucsd.edu)
- The Hub Basic Needs Center (<https://basicneeds.ucsd.edu/>) coordinates basic needs resources vital to thrive as a student, which includes access to nutritious food, stable housing, and financial wellness resources. We provide basic needs services and resource referrals to registered UC San Diego students. Ask us about CalFresh food benefits! [basicneeds.ucsd.edu](https://basicneeds.ucsd.edu) 858-246-2632.