CALIFORNIA STATE UNIVERSITY
FULLERTON
MIHAYLO COLLEGE
OF BUSINESS AND ECONOMICS

Department of Economics
ECON 305: Economics, Causality, and Analytics

Class/Exam Location: SGMH 2113

Class Time: Tuesday and Thursday 1:00 PM-2:15PM

Instruction Modality: In Person

Instructor: Liqing Li

Office: SGMH 3391

E-mail: liqing@fullerton.edu

Office hours: 2:30 PM-3:30 PM Tuesday/Thursday or by appointment

Graduate Assistant virtual office hour: Friday 12pm to 1pm

https://fullerton.zoom.us/j/86984023284

COURSE COMMUNICATION

- All course announcements and individual email are sent through Canvas, which only uses CSUF email accounts. Therefore, you MUST check your CSUF email on a regular basis (several times a week) for the duration of the course.
- It is also important that you HAVE ACCESS to Canvas check it frequently.
- I will be able to help you very easily if you drop by my office hour.
- The best way to communicate with me (outside office hours) is via email. My email is: liqing@fullerton.edu. I normally check my emails frequently and respond promptly. Please give me 24 hours to respond to your email before sending a follow-up email. I promise to respond as quickly as I can!

COURSE DESCRIPTION

In order to make sense of the modern world and learn new things about it, it is necessary to be able to understand data, how to use it, how it is used, and what conclusions can be drawn from it. In this class we will learn how to use the R statistical programming language so that we can work with data. We will also learn the fundamental problems of causal inference (using data to understand how X *causes* Y to happen), and how researchers can conceptually solve these problems.

COURSE OBJECTIVES + LEARNING GOALS

- Understand the problems of causal inference and how economists try to come to causal conclusions using observational (non-experimental) data.

- Learn how to diagram an economic model in order to be able to be able to determine how effects can be identified.
- Learn the standard statistical approaches (causal inference methods) for identifying causal effects.
- Learn how to use the R statistical programming language to interact with economic data and apply causal inference methods.

PRE/CO-REQUISITES

The prerequisite for this class is ECON 201 or ECON 202 or ECON 100. Economics majors should note that ECON 100 does not count towards their major and are strongly encouraged not to take that route.

REQUIRED TEXTS

Topic: Introduction to R programming and workflow

Book: *R for Data Science* (RDS), by Garrett Grolemund and Hadley Wickham.

Availability: free download from http://r4ds.had.co.nz/

Huntington-Klein, N. (2021). *The effect: An introduction to research design and causality*. Chapman and Hall/CRC. **ISBN-13:** 978-1032125787

Availability: free download from https://theeffectbook.net/

OTHER REQUIRED MATERIALS

You will be required to have access to a computer that can run R and RStudio. These can be installed at R-Project and RStudio. These programs are free, can run on every major operating system, and are installed on many campus computers for use.

RECOMMENDED MATERIALS

- Programming resources: Guide to R for SCU Economics Students, Introduction to Econometrics with R, R-Bloggers, StatMethods, Cookbook for R all free.
- *Causal Inference: The Mixtape* (free), give a more advanced and in-depth look at many of the causal inference methods we'll be covering.
- I also suggest the *More or Less* podcast by the BBC and *The Upshot* by the New York Times

Attendance Policy

Attendance is required. I may record attendance in any class by roll call. After the first two absences, each unexcused absence will lower your final course grade by 1%.

Late Assignments

All late homework will be marked down a total of 10% and will not be accepted more than one week after the due date or after the answer keys are posted.

Extra Credit Policy

GRADING STANDARDS, AND CRITERIA

In this course the plus/minus system will be used.

The grade breakdown is as follows:

94 or above = A (outstanding performance)

90 – 93.99 = A-

87 – 89.99= B+

83 – 86.99= B (good performance)

80 – 82.99 = B-

77 – 79.99= C+

73 – 76.99 = C (acceptable performance)

70 – 72.99 = C-

67—69.99 = D+

63 – 66.99 = D (poor performance)

60 – 62.99 = D-

0 –- 59.99 = F

Keep all assignments and exams returned to you so that any discrepancies can be easily and fairly straightened out.

EXAMINATIONS

Attendance at exams are mandatory. The professor must be notified in advance of any unusual problem, which makes a student's taking of an exam at the scheduled time impossible. Only rarely are such excuses accepted, in which case a prompt make-up exam will be given. Excuses must be in writing on official letterhead stationery (that of a doctor, a funeral director, etc.) All excuses must have an official phone number, which will be called for routine verification of the excuse. No exceptions are made to the final exam date mandated by the university.

ASSIGNMENT DESCRIPTIONS

HOMEWORK

All homework assignments are available on Canvas. There is a homework assignment due **Sunday** at **11:59PM** on most weeks, even though this is not a class day. All late homework will be marked down a total of 10%, and will not be accepted more than one week after the due date. **Homework is worth 25% of your course grade.**

DATACAMP

Datacamp assignments are coding assignments on Datacamp.com. It is worth 10% of your total grade. You need to fully complete the assignments by the due date to earn the credits. **Partial credits are not available** for the DataCamp assignments.

RESEARCH DESGIN PROJECT

- Projects must be submitted **electronically by the due date.** If needed, scanners that can generate PDF copies are available in the Library. Make sure scanned images are legible in order to be graded. More detailed instruction will be provided during the semester.
- You may work on and turn the project either (a) as an individual or (b) as a group. There may be no more than two people in a group submission. If you choose to submit work as a group, you must clearly indicate that choice, along with group member names, at the top of the submission.
- Whether or not you submit individually or as part of a group, you are welcome to work on problems with people outside your group. However, beyond the fact that all group members may submit the same answers, each submission must be a submission of independently written answers and separate work. Photocopies, multiple printouts of essentially the same computer file, and close paraphrasing of a classmate's or another group's answers do not qualify as "separate work." Each individual/group must write their answer and accompanying explanations separately. That is, each individual/group should provide your answers in your own words. If any of your answers are too similar to those of individuals or groups, you may receive no credit on the entire problem set.

EXAMS

There will be two midterms, the first of which will focus on programming, which is worth **16%** of your course grade and covers material from the first six weeks of class, and the second mainly on causal inference, which is worth **16%** of your course grade (although there will also be a minor programming component on this midterm as well). There will also be a comprehensive final exam worth **23% of your course grade.** I will describe the type and amount of notes you may bring into the exam.

GRADING COMPONENTS

Assignment	Number	Percent
Homework	10	25%
Midterm 1	1	16%
Midterm 2	1	16%
Final Exam	1	23%
Research Design Project	1	10%
DataCamp R Exercise	6	10%

TECHNICAL REQUIREMENTS

Students are expected to:

1. Have basic computer competency which includes:
    a. the ability to use a personal computer to locate, create, move, copy, delete, name, rename, and save files and folders on hard drives, secondary storage devices such as USB drives, and cloud such as Google Drive (Titan Apps) and Dropbox;
    b. the ability to use a word processing program to create, edit, format, store, retrieve, and print documents;

c. the ability to use their CSUF email accounts to receive, create, edit, print, save, and send an e-mail message with and without an attached file;
d. the ability to use an Internet browser such as Chrome, Safari, Firefox, or Internet Explorer to search and access web sites in the World Wide Web.

2. Have ongoing reliable access to a computer with Internet connectivity and both R and Rstudio installed for regular course assignments
3. Maintain and access three times weekly their CSUF student email account
4. Use Internet search and retrieval skills to complete assignments
5. Apply his/her educational technology skills to complete expected competencies
6. Utilize other software applications as course requirements dictate
7. Utilize Canvas to access course materials and complete assignments

Software for Students

Students can get FREE and low-cost software. Software downloads and request forms can be found on the CSUF Student Software website. Class specific software will be provided. R can be downloaded at R-project.org, and Rstudio can be downloaded at Rstudio.com.

MCBE ASSESSMENT STATEMENT

The programs offered in Mihaylo College of Business and Economics (MCBE) at Cal State Fullerton are designed to provide every student with the knowledge and skills essential for a successful career in business. Since assessment plays a vital role in Mihaylo College's drive to offer the best, several assessment tools are implemented to constantly evaluate our program as well as our students' progress. Students, faculty, and staff should expect to participate in MCBE assessment activities. In doing so, Mihaylo College is able to measure its strengths and weaknesses, and continue to cultivate a climate of excellence in its students and programs.

Assurance of Learning (AoL) is an integral part of both our AACSB and WASC accreditation. For more information on our College-based assurance of learning efforts, please visit the Assessment and Instructional Support website.

UNIVERSITY RESOURCES

University Learning Center

The goal of the University Learning Center is to provide all CSUF students with academic support in an inviting and contemporary environment. The staff of the University Learning Center will assist students with their academic assignments, general study skills, and computer user needs. The ULC staff work with all students from diverse backgrounds in most undergraduate general education courses including those in science and math; humanities and social sciences; as well as other subjects. They offer one-to-one peer tutoring, online writing review, and many more services. More information can be found on the University Learning Center website**.**

Writing Center

The Writing Center offers 30-minute, one-on-one peer tutoring sessions and workshops, aimed at providing assistance for all written assignments and student writing concerns. Writing Center services are available to students from all disciplines. Registration and appointment schedules are available at the Writing Center Appointment Scheduling System. Walk-in appointments are also

available on a first come, first served basis, to students who have registered online. More information can be found at the Writing Center webpage. The Writing Center is located on the first floor of the Pollak Library their phone number is (657) 278-3650.

IMPORTANT UNIVERSITY INFORMATION AND STUDENT POLICY WEBSITE

Topics on the website above include:

Students with Special Needs

Academic Dishonesty Policy

Library Support

Final Exams Schedule

University Learning Goals

Degree Program Learning Outcomes

Emergency Preparedness

CLASSROOM EMERGENCY PREPAREDNESS GUIDE

Emergency Preparedness for: ECON 305

On the first day of every semester:

- Know the emergency exits and evacuation areas for every classroom.
- Devise "buddy systems" so that everyone is accounted for in an evacuation.
- Evaluate the challenges that you might face during an evacuation and speak with your instructor.
- Add the CSUF Emergency Information number – **877-278-1712** – to your cell phone to hear recorded information regarding campus conditions or closure.
- Personal Preparation website

Emergency Communication

Campus emergency communication is done via a voice message, text and/or an email. Go to your Portal to review your contact information. A guide to update your personal information

Evacuations – Drills or real

- You may not know if this is a drill or not, so take every call to evacuate seriously.
- Take your personal belongings and immediately leave the building.
- Know where the evacuation area is for every building. A map of all campus evacuation areas
- Re-enter buildings only when directed by Building Marshals or other campus authority.
- Leave the campus only if instructed.

For this class, the closest 2 exits are: at the front of the room.

We will meet at: note class meeting place

Earthquake

As soon as you feel shaking, **DROP, COVER and HOLD ON**: Immediately seek shelter (under a desk or table) cover your head and hold on. Evacuate if directed, or you feel it is safe to do so.

Fire

- When you see smoke or fire, immediately evacuate the building.
- If not already activated, pull the fire alarm switch to alert others of the situation.
- Use a fire extinguisher only if you know how to use it and the fire is small.

Shelter in Place or Dangerous Situation

- If directed, or you feel it is best to do so, seek shelter in a room with a lock.
- Turn off the lights and silence all cell phones.
- Hide as best as possible until the all clear signal has been given by authorities.
- If possible, move away from the dangerous situation as fast as you can.
- If you cannot safely hide or escape, be prepared to take action to protect yourself.
- See some helpful videos on sheltering in place

When you need help Immediately or to report a dangerous situation, CALL 911.

University Police non-emergency line: (657) 278-2515

For more information

Ask your instructor, or go to Campus Preparedness website

TENTATIVE SCHEDULE

Week	Date	Topic
Week 1	Aug 23 & Aug 25	**Understanding Data** *What we can do with data* *Where data comes from* *What we get out of looking at data* *Difficulties of working with data*
Week 2	Aug 30 & Sep 1	**Getting Started in R** *Getting used to RStudio* *Set working directory* *Basic commands in R* *Working with objects Variable types*

Week 3	Sep 6 & Sep 8	**Working with Data in R (Part I)** *Data frames* *Loading in data* *Manipulating variables*
Week 4	Sep 13 & Sep 15	**Working with Data in R (Part II)** *Join dataframes* *Exploring different kinds of variables*
Week 5	Sep 20 & Sep 22	**Summarizing Data** *Summarizing and graphing variables* *Summaries by Group*
Week 6	Sep 27 & Sep 29	***Review for Midterm 1*** ***Midterm 1 (Sep 29th)***
Week 7	Oct 4 & Oct 6	**Relationships Between Variables** *Scatterplots and grouped bar graphs* *Correlations*
Week 8	Oct 11 & Oct 13	**Simulating Data** *Creating random data* *Constructing true relationships* *Uncovering true relationships* *Correlations vs Causation*
Week 9	Oct 18 & Oct 20	**Causal Inference (Part I)** *What is causality?* *The problem of causal inference* *Models and causality*
Week 10	Oct 25 & Nov 27	**Causal Inference (Part I)** *Ceteris paribus (Other Things Equal)* *Randonmized Experiments*
Week 11	Nov 1 & Nov 3	**Causal Inference (Part II)** *Limits of Randonmized Experiments* *Controlling variables*

Week 12	Nov 8 & Nov 10	**Causal Inference (Part II)** *Matching* *Difference in Difference*
Week 13	Nov 15 & Nov 17	**Causal Inference (Part II)** *Regression Discountinuity*
Week 14	Nov 22 & Nov 24	**Fall Recess** **No Class**
Week 15	Nov 29 & Dec 1	***Review for Midterm 2*** ***Midterm 2 on Dec 1***
Week 16	Dec 6 & Dec 8	**Explaining Better** *Other methods of using one variable to explain another* *Final exam review*
Final week	Final Exam	12/13/2022, Tuesday 1:00PM - 2:50PM Location: SGMH 2113 - Computer Lab