Econ 320: Econometrics LAB (1/2)

Fall 2025

Instructor: Ka Yan Cheng
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(*Please include your section number (i.e., Econ 320 LAB (1/2)) at the beginning of the subject of your email.)

Office Hours:
Friday 11:30 am – 2:00 pm on Zoom and by appointment.*
(*To make the best use of office hours, please email the instructor to schedule a time block before attending. This ensures the instructor can allocate sufficient time for each student as needed. You are also encouraged to schedule office hours as a group when appropriate.)

Class Time & Classroom:
Lab1 – Friday 8:30 am – 9:20 am in White Hall 200
Lab2 – Friday 10:00 am – 10:50 am in White Hall 200

Overview

This course provides hands-on experience with econometric methods, from foundational data analysis to advanced causal inference techniques. Using programming language Python, students will learn how to manage data, run regressions, test hypotheses, and interpret results in real-world economic contexts. Topics include descriptive statistics, data visualization, simple and multiple linear regression, qualitative data handling, model specification issues, inference methods, and robust standard errors. In an era of expanding generative AI tools, we will place special emphasis on developing the ability to question results, evaluate assumptions, and draw sound conclusions from data.

Learning Objectives

By the end of this course, students will be able to:
1. Organize, clean, and present economic data clearly and effectively.
2. Apply OLS method to estimate linear regression models (simple and multiple) to analyze relationships between variables.
3. Incorporate qualitative data into regression models using dummy variables and interactions.
4. Diagnose and address common specification issues such as multicollinearity and omitted variable bias.
5. Perform hypothesis testing (t-tests, F-tests) and compute heteroskedasticity-robust standard errors.
6. Think critically before drawing causal conclusions.

Happy learning!

Course Materials

All course materials will be prepared by the instructor and provided in the form of Jupyter Notebooks. These notebooks will be organized into three folders:

Empty

Notebook templates with no code filled in, for use during class.

Completed

Fully worked examples for reference after class.

Lab exercises

Practice problems to reinforce concepts.

Materials will be available on **both Canvas and GitHub Classroom** for easy access.

Grading

Assessments

Problem Sets

There will be four problem sets in total, and the **lowest grade will be dropped** automatically to accommodate unexpected circumstances. Late submissions will follow the course's late work policy.

Weekly Lab Exercises & Attendance

Weekly Lab Exercises

Weekly lab exercises are based directly on the material covered during the lab session. Students must **complete and submit these exercises by the end of the same week as the lab** to reinforce learning while the material is fresh and to encourage regular attendance.

Lab exercises will be graded on completion rather than correctness. However, students are expected to make a genuine effort on all parts. The instructor reserves the right to assign a reduced grade or no credit if the work is incomplete or shows minimal effort. Late submissions will follow the course's late work policy. To allow for unforeseen circumstances, the **lowest weekly lab grade will be dropped** from the final grade calculation.

Attendance

At the start of each lab session, a short starter code will be provided. **Students must insert this code into their weekly lab exercise for that session to receive attendance credit**. This code is distributed only during class and is intended solely for students who are present. Sharing the code with anyone who did not attend the lab is a violation of the academic integrity policy. An incorrect or missing code will result in zero attendance

credit for that class, and **students must not attempt to guess or fabricate the code.**

To account for rare unavoidable absences, a **lab submission without the starter code will still be granted with the attendance credit for up to three times during the semester**. After this limit is reached, any lab submitted without the starter code will receive zero attendance credit. Student may still earn full completion credit for the lab itself, even without attendance credit.

Final Group Project

Students will form groups of **4–5 members** to analyze an economic question of interest using the econometric skills learned in lecture and lab sessions. The project should involve identifying a clear research question, applying appropriate econometric methods, interpreting results, and presenting findings in a clear and professional manner. Groups are encouraged to select topics that are relevant, data-driven, and feasible within the timeframe of the course.

Additional details and expectations of the project will be announced separately in class and on Canvas.

Proposal

One page summarizing the research question, data source(s), proposed econometric methods, and expected challenges. **The topic must be approved by the instructor before you begin analysis.**

Final Report

A complete written analysis including introduction, literature context, data description, methodology, results, **discussions** (e.g., implications, robustness checks), and conclusion.

Presentations

A 15 minutes in class presentation summarizing the project question, method, main results, and discussions.

Grade Distribution*

Component	Sub-component	Grade Distribution	
Problem Sets	—	25%	
Weekly Lab Exercises	—	25%	
Attendance	—	10%	
Final Group Project	Proposal	5%	40%
	Final Report & Presentation	35%	

Other Grading Policies

Assignments Submission (Submission Platform & Format)

All completed assignments (Problem Sets, Weekly Lab Exercises, Proposal for Group Project, Final Report for Group project) must be submitted **through Canvas**. Students are responsible for ensuring that their submission is successfully uploaded before the stated deadline. Technical issues, including incomplete uploads or file errors, will not be accepted as excuses for late submission unless they are **documented** and communicated to the instructor **before the deadline**.

Unless otherwise specified, assignments must be submitted in **PDF** format (exported from Jupyter Notebook). File names should follow the format:

```
FirstName_LastName_AssignmentName.pdf
(e.g., KaYan_Cheng_PS2.pdf/KaYan_Cheng_Lab2.pdf).
```

Submissions that do not meet the required file format or naming convention may receive a penalty or be returned for resubmission.

Late Submission

Any late submission after the due date/time is allowed with a 20% penalty per day. **Any extension will not be granted.**

Regrade Policy

If you believe there is an error in your grade, please email me **within one week of the grade being posted**. Your email should clearly state the specific concern and reference the relevant part of your work.

Group Work

Students are encouraged to discuss and collaborate with one another. However, you must write and submit your own solutions for all assignments (except for the Proposal and the Final Report for the Final Group Project). Directly copying another student's work or allowing your work to be copied is a violation of the academic integrity policy.

Tentative Course Schedule (Subject to change)

The schedule below outlines the planned topics, assignments, and deadlines for the semester. Dates and content are subject to change, and any updates will be announced in class and posted on Canvas.

Week	Date	Topic for Lab Session	Assignment
0	Aug 29	Class Logistics & Getting used to GitHub Classroom	
1	Sep 05	Review: Descriptive Statistics & Basic Python Coding	Lab Exercise 1 due
	Sep 10	—	**Problem Set 1 due**
2	Sep 12	Understanding and Presenting Data	Lab Exercise 2 due
3	Sep 19	OLS Estimator for Simple Linear Regression	Lab Exercise 3 due
4	Sep 26	OLS Estimator for Multiple Linear Regression	Lab Exercise 4 due
	Oct 01	—	**Problem Set 2 due**
5	Oct 03	Incorporating Qualitative Data	Lab Exercise 5 due
	Oct 08	—	*Project Proposal due*
6	Oct 10	Multicollinearity	Lab Exercise 6 due
7	Oct 17	Omitted Variable Bias	Lab Exercise 7 due
	Oct 22	—	**Problem Set 3 due**
8	Oct 24	Asymptotic Analysis	Lab Exercise 8 due
9	Oct 31	Inference: t Test & F Test	Lab Exercise 9 due
10	Nov 07	Heteroskedasticity-robust standard errors	Lab Exercise 10 due
	Nov 12	—	**Problem Set 4 due**
11	Nov 14	Critical Thinking & Causal Inference: Endogeneity & Instrumental Variables (IV)	Lab Exercise 11 due
12	Nov 21	TBD	Lab Exercise 12 due
13	Nov 28	Thanksgiving Recess (No Class)	—
14	Dec 05	Final Project Presentations	*Final Project Report due*

Other Class Policies

Participation

You are **required to bring your laptop to class** so you can follow along with examples, participate in coding exercises, and work on lab activities during the session.

Communications

Email

Please do not hesitate to email me with course-related questions or concerns. I aim to reply **within 48 hours window during weekdays and business hours (meaning emails sent between 5:00pm and 9:00am will be taken as 9:00am emails of the next business day).** If you have not received a response by then, feel free to send me a friendly reminder. Emails sent on the same day an assignment is due may not receive a reply before the deadline, so please plan ahead to ensure you have the information you need in time.

Canvas

All announcements will be posted on Canvas—please **turn on notifications** to stay informed. **Grades will be uploaded to Canvas regularly. If you notice any discrepancies, please notify the instructor immediately.**

Students Who Enroll After the Class Has Started

Students who enroll after the class has begun **must notify the instructor immediately upon enrollment**. Attendance will be recorded beginning with their first enrolled lab session; any sessions held before that date will not count against their attendance record. However, these students are responsible for reviewing all missed material and **are required to submit past assignments**, unless otherwise excused by the instructor. **Deadlines for completing and submitting these assignments will be within two weeks of enrollment.** Late submissions will follow the course's late work policy.

AI use

Students are encouraged to explore and use AI tools to aid their understanding of course topics and to support their work on assignments. However, it is important to keep in mind is that these tools are intended for assistance, not as a substitute for the student's own analysis and reasoning. Students are responsible for understanding how to use such tools effectively, verifying the accuracy of any information or code they produce, and ensuring that all submitted work reflects their own understanding.

Academic Integrity

The Honor Code is in effect throughout the semester. By taking this course, you affirm that it is a violation of the code to cheat on exams, to plagiarize, to deviate from the teacher's instructions about collaboration on work that is submitted for grades, to give false information to a faculty member, and to undertake any other form of academic misconduct. You also affirm that if you witness others violating the code you have a duty to report them to the honor council. For more information about the Honor Code, please visit here.

Students with Disabilities and Any Other Learner Support Information

If you have a documented disability and have anticipated barriers related to the format or requirements of this course, or presume having a disability (e.g. mental health, attention, learning, vision, hearing, physical or systemic), and are in need of accommodations for this semester, I encourage you to contact the Department of Accessibility Services (DAS) to learn more about the registration process and steps for requesting accommodations. If you are a student that is currently registered with DAS and have not received a copy of your accommodation notification letter within the first week of class, please notify DAS immediately.

Students who have accommodations in place are encouraged to coordinate sometime with your instructor, during the first week of the semester, to communicate your specific needs for the course as it relates to your approved accommodations. All discussions with DAS and your instructor concerning the nature of your disability remain confidential. For additional information regarding DAS, please visit the website.