ECON 171 : Advanced Econometrics Spring 2026

University of California, Merced

Instructor: Jose Rosa
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Office Hours: Tues 12-1pm Thurs 12-2pm COB 373
Class Format: In-person
Meets: Tues/Thurs, 3:00–4:15 pm **Location:** COB2 265
Communication: CatCourses: announcements, files, and grades will be posted there. Please communicate with me via CatCourses

Course Introduction

Econometrics is the application of statistical techniques to test economic theories, estimate economic relationships, and evaluate policy using real world data. For example, econometrics is the practice of using data to find answers to such questions as "Does an increase in the minimum wage lead to higher levels of unemployment?", "What is the monetary return in income for an extra year of education?", and "Does increasing access to credit increase entrepreneurship?"

This course will focus on developing different techniques that are commonly used in empirical research. This course assumes that students are familiar with the simple linear regression and multiple regression analysis and will build on this foundation. Students will learn how to analyze data, make informed conclusions, and critique the limitations and assumptions of empirical analysis.

Prerequisites

- **Introductory Econometrics** C– or better in ECON 110.

Required Materials

- No required textbook. All material will be on lecture notes.
- **Recommended Textbooks:**
  - "Introduction to Data Analysis and Econometrics" by Mark V. Siegler
  - "Causal Inference" by Scott Cunningham
  - "Introductory Econometrics, A Modern Approach" by Jeffrey M. Wooldridge

Learning Outcomes

Course Learning Outcomes

1. Build upon knowledge from Econ 10 and Econ 110 to analyze economic phenomenon with more complex estimators and approaches
2. Apply knowledge of econometrics to data using statistical software
3. Critically examine the econometrics used in the economics literature

Programmatic Learning Outcomes

This course's Goals and Learning Outcomes meet several of the Economics Program Learning Outcomes, the Management & Business Economics (MBE) Program Learning Outcomes, and the General Education (GE) Program Learning Outcomes listed below. For a map of the specific PLOs that this course satisfies, please refer to the program curriculum maps.

Economics Program Learning Outcomes

1. Describe the underlying economic incentives and tradeoffs associated with the decisions made by individuals, firms, international organizations and governments.
2. Apply economic concepts in analyzing policy debates and evaluating policy outcomes.
3. Design and conduct research that can inform managerial and economic policymaking, including by collecting, analyzing and interpreting data using relevant software.
4. Demonstrate critical, evidence-based thinking about economic phenomena, whether encountered in coursework or in media reports, so that students can evaluate the accuracy of hypotheses presented.
5. Communicate clearly and cogently in written and oral form in academic and professional environments.

MBE Program Learning Outcomes

1. Describe the underlying economic incentives and tradeoffs associated with the decisions made by individuals, firms, organizations, institutions and governments.
2. Apply theories and concepts from disciplines in Management and Business Economics (e.g., accounting, economics, statistics, finance, and marketing) to business management situations.
3. Communicate clearly and cogently in written and oral form within professional and academic environments.
4. Design and conduct research that can inform managerial and economic policymaking, in part by collecting, analyzing and interpreting data using relevant software.
5. Describe and evaluate the relevant ethical and social issues associated with different economic and business ventures.

General Education Program Learning Outcomes

1. Life at the Research University: Asking Questions.
2. Reasoning: Thinking Critically.
3. Communication: Explaining and Persuading.
4. Cultural and Global Awareness: Engaging with Differences.
5. Citizenship: Contributing to the Public Good.

Grading

Component	Weight
Attendance/Participation	10%
In-class/Reflection assignments (lowest 3 dropped)	35%
Midterm Exams (2 at 15% each)	30%
Final	25%
Total	100%

Attendance/Participation (10%). Discussion and participation are extremely important as we engage in new material so Attendance/Participation will be worth 10% of your grade. With this, I ask for students to arrive on time to class and be ready to participate/discuss and engage. I will be using a random name picker to assist the class in answering questions, so engagement is important.

Some things to note:

1. Students arriving late/leaving early without an emergency will receive half-credit for that day.
2. Students using electronic devices for purposes outside of note-taking, or solving problems related to this course will receive half-credit for the day. My recommendation is that you only use a notebook/tablet in this class.
3. To accommodate for unforeseen events that causes you to miss class, I will have CatCourss automatically drop 3 absences, no questions asked

In-class assignments and reflection assignments (35%) Instead of traditional homework, most weeks will include an in-class assignment. At the start of class, I will give a brief (about 15-minute) recap of the material you need, and you will use the remainder of the period to complete and submit the assignment. These are low-stakes as grading emphasizes completion and good-faith effort, with accuracy playing a smaller role. The goal is to help you surface any misunderstandings that we can fix in real time.These problems will be intentionally challenging to spark discussion and collaboration. You are strongly encouraged to talk with classmates and work through the questions together.

In addition, there will be bi-monthly take-home reflection assignments. These reflections serve as an extension to our in-class assignments, but mainly will be used to inquire what your intellectual-growth. Reflections are graded on completion only so please do not use external tools.

Exams (30%). Two midterms (closed book/notes). These will be graded mainly on conceptual accuracy and ability to communicate your mastery of the material. I will have a practice exam uploaded at least a week before the midterm.

Final 25% A cumulative final. Note: I want to reward you for improving your understanding of the material that we will learn in the course, so I will allow the score from your cumulative final exam to replace either (or both) midterms if it helps your overall score in the course. Please note that this policy is "the final can replace the midterms", but not "the midterms can replace the final.

Grading Scale

A+: 98–100; A: 93–97.99; A-: 90–92.99; B+: 87–89.99; B: 83–86.99; B-: 80–82.99; C+: 77–79.99; C: 73–76.99; C-: 70–72.99; D+: 67–69.99; D: 63–66.99; D-: 60–62.99; F: <60.

Important Dates for this class

- Instruction begins: **Jan 20**
- Last Day to Drop Class online: **Feb 9**
- **Exam 1: Thurs Feb 19**
- **Exam 2: Thurs April 16**
- Spring Break: Monday March 23- Friday March 27 2026 (**no class**)
- Course withdraw deadline: **Apr 7**
- **Final exam: Monday May 11 6PM**

Weekly Schedule

Subject to adjustment for pace and learning needs.

Week	Dates	Topics / Assessments
W0	Tues Jan 20; Thurs Jan 22	Syllabus, course intro; Pre-test
W1	Tues Jan 27; Thurs Jan 29	Probability review
W2	Tues Feb 3; Thurs Feb 5	Estimators, bias, consistency, standard errors
W3	Tues Feb 10; Thurs Feb 12	OLS assumptions, Gauss-Markov, hypothesis testing
W4	Tues Feb 17; Thurs Feb 19	Review; Midterm 1
W5	Tues Feb 24; Thurs Feb 26	Potential outcomes & randomized experiments
W6	Tues Mar 3; Thurs Mar 5	Omitted variable bias & DAGs
W7	Tues Mar 10; Thurs Mar 12	Difference-in-Differences
W8	Tues Mar 17; Thurs Mar 19	Regression Discontinuity
W9	Tues Mar 24; Thurs Mar 26	SPRING BREAK!
W10	Tues Mar 31; Thurs Apr 2	Panel data & fixed effects
W11	Tues Apr 7; Thurs Apr 9	Instrumental Variables & 2SLS
W12	Tues Apr 14; Thurs Apr 16	Review; Midterm 2
W13	Tues Apr 21; Thurs Apr 23	Time series & forecasting
W14	Tues Apr 28; Thurs Apr 30	Machine Learning for causal inference
W15	Tues May 5; Thurs May 7	Synthetic control & matching; Final review

Classroom Norms and Communication

We succeed by asking questions and learning from errors. Please Participate and collaborate with your classmates with upmost respect. Something I like to repeat a lot is the point of asking questions is mainly reveal and discover weaknesses in our knowledge, so that we can correct them in-time. If you have questions :

- Come to student hours often (no question is too small!).
- Ask questions in class; if you're wondering, three others are too. To the extent possible, I will pause and check-in for understanding as well.
- Use CatCourses for public questions so answers help everyone. I have opened an anonymous discussion board on Catcourses for Q&A so answers help everyone.

Late/Make-up Policy

Extensions considered for documented illness, religious observance, or emergencies; contact me as soon as feasible. **All Exams including the final exam must be taken in person at the scheduled time** If a conflict arises due to a university-sanctioned event, contact me at least two weeks in advance.

Academic Honesty

Please refer to the UC Merced Academic Honesty Policy for a detailed description of the academic honor code on campus.

You can view the UC Merced Academic Honesty Policy here: Academic Honesty Policy (UC Merced)

Student Accessibility

If you anticipate or experience barriers due to pregnancy, temporary medical condition, or injury, please feel welcome to contact me so we can discuss options. University of California, Merced is committed to creating learning environments that are accessible to all. If you anticipate or experience physical or academic barriers based on a disability, please feel welcome to contact me privately so we can discuss options. In addition, please contact Student Accessibility Services (SAS) at (209) 228-6996 or access@ucmerced.edu as soon as possible to explore reasonable accommodations. All accommodations must have prior approval from Student Accessibility Services on the basis of appropriate documentation.

Inclusive Learning

UCM's diversity is our strength. Please provide feedback on approaches, content, or language that can help make the course more inclusive, respectful, and effective for everyone.

Note: Syllabus subject to change with advance notice in class and on CatCourses.