

# Econ 4223: Econometric Analysis

University of Oklahoma  
Fall 2025

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**Instructor:** Judith Liu  
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**Office:** Cate Center One 430  
**Office Hours:** Tue/Thu 1:00 - 2:00 pm

**Class Location:** Cate Center One 338  
**Class Times:** Tue/Thu 4:30 - 5:45 pm

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**Office Hours:** Mon/Wed 3:00 - 4:00 pm (please email before stopping by)

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## Course Description

This course is designed to help students learn the conceptual and statistical machinery that form the foundation of economic research. The course will also help students develop skills in using computer software to perform data analyses.

## Student Learning Outcomes

By the end of the course, students should be able to do the following:

1. Demonstrate an understanding of the theoretical foundations of estimating and testing the basic regression model, employing tools from statistics (including calculus).
2. Perform basic regression and testing procedures using the R programming language
3. Complete an empirical research project that includes the following elements
  - Formulate an econometric model.
  - Collect and prepare relevant data for use in estimating the model.
  - Use appropriate methods of estimation.
  - Test relevant behavioral hypotheses.

- Understand and test the Gauss-Markov assumptions.
- Analyze and interpret the estimated model.
- Prepare a written report summarizing the research results.

For further detail on course content, see the course schedule at the end of this document. This is a 3-credit-hour course, which means we will have about 3 hours per week of class. You should expect to spend, on average, another 4-6 hours per week outside of class on reading, preparation, homework, and review.<sup>1</sup>

## Prerequisites

- Econ 1113 (Principles of Macroeconomics)
- Econ 1123 (Principles of Microeconomics)
- Econ 2843 (Elements of Statistics)

## Textbook and other materials

Materials for the course will be assigned from the following sources:

1. The e-textbook for this course will be MindTap for *Introductory Econometrics: A Modern Approach* (8th ed.), by Jeffrey M. Wooldridge.<sup>2 3</sup>
2. *The Effect: An Introduction to Research Design and Causality* (by Nick Huntington-Klein), **free** e-Book available [here](#).
3. *R for Data Science* (by Hadley Wickham and Garrett Grolemund), **free** e-Book available [here](#).
4. *Using R for Introductory Econometrics* (by Florian Heiss), **free** e-Book available [here](#).
5. *Econometrics in R* (by Grant V. Farnsworth), reference guide (PDF) available for **free** [here](#).

## Course website

Class announcements and homework will be posted on the course website on Canvas: <https://canvas.ou.edu>. It is your responsibility to check the site regularly—at least every day class is held. All important announcements will be posted there.

<sup>1</sup>From OU's "How to Graduate a Sooner" webpage: "On average, you should expect to spend 2-3 hours outside of class studying for each credit hour you are taking." ([http://www.ou.edu/graduatesooner/resources/graduate\\_a\\_sooner.html](http://www.ou.edu/graduatesooner/resources/graduate_a_sooner.html))

<sup>2</sup>This course has been selected for the OU Inclusive Access (IA) program, which provides less expensive digital course materials delivered directly through Canvas. All IA materials are available to enrolled students on or before the first day of class when you log in to Canvas. They are listed at your campus bookstore, but no further action is needed to purchase them. Your student Bursar account will be charged directly for these digital materials at a significant discount. You have the option to opt out of this program, but the materials are required for this course.

<sup>3</sup>Enroll in your MindTap course in 3 easy steps: (1) Log into your Canvas account and click on the link for this course (*you will not need a course key to register for MindTap*). (2) Click any link to Cengage content to continue the registration process. Your Cengage course materials will open in a new tab or window, so be sure pop-ups are enabled. (3) Link your Canvas account to your Cengage account. If you don't yet have a Cengage account, you can create one by clicking 'Create an Account.' It is highly recommended to use your school email address.

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## Grading policies

Your grade will be determined by the following criteria:

- Problem sets (20%)
  - 5 problem sets throughout the semester. Consist of proofs, derivations, and empirical exercises in R. You may work in groups but you must turn in an individual copy.
- In-class activities (15%)
- Midterm exam (20%)
- Comprehensive final exam (20%)
  - The final exam will be cumulative, and it will account for 20% of the course grade. Students whose final exam score exceeds their midterm score will receive the final exam score for the midterm exam if the midterm score was lower.
- An original econometric research paper (25%)
  - Proposal (due during the 4th week of classes—see assignment schedule at end of this document and on Canvas).
  - Data summary statistics (due during the 7th week of classes).
  - Initial R analysis file (due during the 9th week of classes).
  - Polished initial draft (due during the 12th week of classes and distributed to another class member).
  - Reading and commenting on a fellow student's draft (due during the 14th week of classes).
  - 10-minute in-class presentation of findings and participation (due during the 15th and 16th weeks of classes).
  - Final draft (due on the final exam date).
- Bonus (5%)
  - Open-book reading quizzes taken online.
  - Bonus based on the average of the best 5 out of 7 quizzes.

**Exam regrading** Exams are graded carefully and original grades are rarely changed. If you believe that a grading mistake was made on your work, you can submit a written request for a regrade to me within one week of its return. This request must contain a detailed explanation of the grading errors. Your entire exam will be regraded and the score may go up or down as a result.

**N.B.** I do not release end-of-course grades before they are posted by the Registrar. Federal regulations prohibit me from revealing any grade to you by email. Grades will be updated on the course website on Canvas throughout the semester.

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## Grading scale

At the end of the course, I will compute a final percentage grade based on component percentages of each grade category using the weights given above. I will then convert this final percentage grade into letter grades according to the following scale (where  $g$  indicates your final percentage grade):

$90\% \leq g$	$\leq 100\%$	A
$80\% \leq g$	$< 90\%$	B
$70\% \leq g$	$< 80\%$	C
$60\% \leq g$	$< 70\%$	D
$0\% \leq g$	$< 60\%$	F

I reserve the right to scale upwards everyone's final percentage grades by a common factor (e.g. 1.1), but the course will not be graded on a curve, and no one's final percentage grade will be lowered.

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## Classroom etiquette

I value your presence in my class, and I want your classmates to feel the same way. You are welcome to eat/drink during class as long as food/drink is permitted in the classroom and you do not disrupt or distract others by doing so. Note that smoking is prohibited on all OU property. Please silence your cell phones, pagers, or other electronic devices during class, and do not use them in the classroom. If you need to respond to a text/social media message, or make a phone call, please leave the classroom before doing so. You should bring your laptop to class (if you have one), as we will do in-class exercises almost every class period. Please do not use your laptop for work that is not directly related to what we are doing in class. Doing so has been scientifically proven to reduce your own academic performance, as well as that of your peers.<sup>4</sup>

## Contacting me

I will always be available during my office hours. You may also stop by my office anytime my door is open. If you would like to meet with me outside of class but are unable to make it during my office hours, please do not hesitate to email me to make an appointment.

If you ever need to email me or any other professor at OU, please follow the basic rules contained at the following link: <http://www.jamestierney.com/teaching/how-to-email-a-professor/>

I will promise to reply to your email within 48 hours of your sending it.

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<sup>4</sup>See, for example, [this NYT column](#).

## **Course Policies**

### **Late Work**

All work should be turned in on the date/time it is due. Late work will be accepted with a **40%** penalty but will not be accepted one day following the due date. Work submitted more than 10 minutes after the deadline is considered late.

### **Make-up Policy**

There will be no makeup exams without acceptable documentation showing you have a legitimate excuse for missing the exam. These reasons include illness, family-related issues/emergencies, and required participation in a university-sanctioned event. Students who need to miss an exam must let me know in advance.

### **Absences**

Absences from class will only be excused for university approved reasons, illnesses, or other unforeseen emergencies.

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## **University Policies**

### **Religious Observance**

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

### **Reasonable Accommodation Policy**

If a student requires an accommodation based on disability, the student should meet with me in my office during the first week of the semester. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels. The Disability Resource Center is located in the University Community Center at 730 College Avenue (405-325-3852).

### **Academic Integrity**

I do not tolerate academic misconduct, and neither does the University of Oklahoma:

“Academic misconduct is cheating. More precisely, it is any action that a student knows (or should know) will lead to the improper evaluation of academic work. If the professor does not detect it, academic misconduct defeats the purpose of academic work because you are pretending to know more or write better than you actually do.

...

“At OU, acts of plagiarism can receive institutional penalties ranging from a letter of reprimand to required coursework to expulsion. All academic misconduct offenses

also receive grade penalties determined by the instructor. Grade penalties are not restricted to the value of the assignment and may be up to an F in the course. Juniors and seniors who plagiarize any significant portion of a paper should expect at least a suspension for a spring or fall semester. Under the right circumstances even freshmen and sophomores may also receive suspensions or even be expelled for plagiarism.”

—[http://integrity.ou.edu/files/nine\\_things\\_you\\_should\\_know.pdf](http://integrity.ou.edu/files/nine_things_you_should_know.pdf)

For further information on what constitutes academic misconduct, as well as how such misconduct is punished, please consult the Student Guide to Academic Dishonesty, found at the following link:

<https://integrity.ou.edu/students.html>

I will not hesitate to fail students who do not fully comply with the University’s academic misconduct policy. If you find yourself contemplating cheating, plagiarism, or other forms of academic misconduct, please come see me first. Help is available if you are struggling. I want everyone in the class to try their best and to do their own work. Please be advised that I reserve the right to utilize anti-plagiarism resources such as *TurnItIn* when grading assignments.

## **Generative AI Policy**

To ensure meaningful learning, all assignments in this course must reflect your own ideas and work. Generative AI tools may be used for limited purposes, such as gathering background information or assisting with coding, but they should not be used to complete homework assignments or write final papers. Any inappropriate use of AI in graded work will be considered a violation of academic integrity.

## **Title IX Resources and Reporting Requirement**

For any concerns regarding gender-based discrimination, sexual harassment, sexual assault, dating/domestic violence, or stalking, the University offers a variety of resources. To learn more or to report an incident, please contact the Sexual Misconduct Office at (405) 325-2215 (8 to 5, M-F) or [smo@ou.edu](mailto:smo@ou.edu). Incidents can also be reported confidentially to OU Advocates at (405) 615-0013 (phones are answered 24 hours a day, 7 days a week). Also, please be advised that a professor/GA/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. Inquiries regarding non-discrimination policies may be directed to: Bobby J. Mason, University Equal Opportunity Officer and Title IX Coordinator at (405) 325-3546 or [bjm@ou.edu](mailto:bjm@ou.edu). For more information, visit <http://www.ou.edu/eoo.html>.

## **Adjustments for Pregnancy/Childbirth Related Issues**

Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact me or the Disability Resource Center at (405) 325-3852 as soon as possible. Also, see <http://www.ou.edu/eoo/faqs/pregnancy-faqs.html> for answers to commonly asked questions.

## Class Schedule, Page 1

Week	Date	Topics to cover	Pre-class reading	Due	In-class activity
1	Tue Aug 26	Intro to the course			Using MindTap; Installing R/RStudio
	Thu Aug 28	Statistics review	W: Skim 1.1-1.4, Read Math Refr. C.1-C.3, C.6a-C.6b, C.6d	Get to know you	Exploring data
2	Tue Sep 2	Bivariate regression	W: 2.1-2.3	RQ1	Hypothesis testing
	Thu Sep 4	Bivariate regression	W: 2.4-2.5		Regression, interpretation
3	Tue Sep 9	Multiple regression	W: 3.1-3.2	RQ2; <b>PS1</b>	Multiple regression
	Thu Sep 11	Multiple regression	W: 3.3-3.4		Omitted Variable Bias
4	Tue Sep 16	Multiple regression	W: 3.5, 7.1-7.6 (skip 7.4c, 7.6a)	RQ3	Dummy variables, LPMs
	Thu Sep 18	Inference	W: 4.1-4.3	<b>Paper proposal</b>	Simple hypothesis testing
5	Tue Sep 23	Inference	W: 4.4-4.6	<b>PS2</b>	Joint hypothesis testing
	Thu Sep 25	Review; How to read in data	W: 19.2-19.3, 19.5		Review sheet; work on data
6	Tue Sep 30	GMT violations: heteroskedasticity	W: 5.2a, 8.1-8.2	RQ4	LM test, robust SEs
	Thu Oct 2	GMT violations: serial correlation	W: 10.1, 12.1-12.2, 12.6		Serial corr. robust SEs
7	Tue Oct 7	GMT violations: $E[u X] \neq 0$	W: 9.1-9.6 (skip 9.1a, 9.1b, 9.2b, 9.2c, 9.3)	<b>PS3</b>	Work on project
	Thu Oct 9	Review for Midterm	Midterm materials	<b>Data summary</b>	Q&A Session
8	Tue Oct 14	<b>Midterm Exam</b>			Exam
	Thu Oct 16	Instrumental Variables	W: 15.1-15.2		IV estimation

Note: "W" stands for "Wooldridge"; "RQ" stands for "Reading Quiz"; "PS" stands for "Problem Set"

## Class Schedule, Page 2

Week	Date	Topics to cover	Pre-class reading	Due	In-class activity
9	Tue Oct 21	Instrumental Variables	W: 15.3	RQ5	2SLS estimation
	Thu Oct 23	Time series	W: 11.1-11.3	<b>Initial R analysis</b>	Work on project
10	Tue Oct 28	Time series forecasting	W: 18.5	RQ6	Time series
	Thu Oct 30	Panel: fixed effects	W: 13.1,13.3,14.1	<b>PS4</b>	Work on project
11	Tue Nov 4	Panel: random Effects	W: 14.2	RQ7	Panel data methods
	Thu Nov 6	Panel: diff-in-diff	W: 13.2, 13.4		Diff-in-diff
12	Tue Nov 11	Nonlinear models	W: 17.1	<b>PS5</b>	Nonlinear models
	Thu Nov 13	Advanced methods	Reading	<b>Polished initial draft</b>	Work on project
13	Tue Nov 18	Review	Final materials		Review sheet
	Thu Nov 20	<b>Final Exam</b>			Exam
14	Tue Nov 25	No class		<b>Read/comment on fellow student's draft</b>	
	Thu Nov 27	No class (Happy Thanksgiving!)			
15	Tue Dec 2	Student presentations		Project presentation	
	Thu Dec 4	Student presentations		Project presentation	
16	Tue Dec 9	Student presentations		Project presentation	
	Thu Dec 11	Student presentations		Project presentation	
17	Mon Dec 15	<b>Final Paper</b>		<b>Final draft</b>	

Note: "W" stands for "Wooldridge"; "RQ" stands for "Reading Quiz"; "PS" stands for "Problem Set"