ECON 474 – Econometrics of Policy Evaluation Fall 2022

▲ Julian Wade Oolman ☑ jjpwade2@illinois.edu ✔ DKH 119 🏙 TR ② 9:30am-10:50am

♥ DKH 15 **★** ♥ Wed. 3:30pm-4:30pm
Fri. 8:00am-9:00am

• Piazza

% Canvas

Course Description

Develops the basic tools to understand and use modern econometric methods for estimating and making inference of causal effects. The topics include randomized experiments, natural experiments, matching methods, instrumental variables, and regression discontinuity. Focuses on topics which are relevant for policy problem.

Required Software

R and RStudio
R Markdown

Required Reading

R for Data Science by Hadley Wickham & Garett Grolemund (2017) Causal Inference: The Mixtape by Scott Cunningham (2021)

Additional Reading

- (Recommended) Mastering Metrics by Joshua Angrist & Jörn-Steffen Pischke (2015)
- (Econometrics review) Introductory Econometrics by Jeffery Wooldridge (2020)
- (Graduate-level) Mostly Harmless Econometrics by Angrist & Pischke (2009)
- Various illustrative academic papers

Learning Objectives

By the end of the course, you should have a solid understanding of which settings are suited to causal inference. Moreover, you should know which techniques to apply when. You should also understand the assumptions and limitations of each technique.

You should will feel comfortable programming in **R**. This includes implementing the statistical techniques learned in class, processing data, plotting data, and presenting results. You will also learn how to write basic LATEX math and how to write a document in Markdown.

This course is also intended to help you interact with the material and teach you good analyst habits. Coding is not as glamorous as Hollywood would have you believe. It is a lot of, why the @#!&\$ isn't my code working? We will learn how to debug our code.

Teaching Philosophy

- I don't believe in busy work
- My goal is to teach you skills useful for a career
- Computers are dumb; (some) theory is vital to understanding the why and when of econometric tools
- I am here to help you learn. Ask questions, communicate with me, be a nerd.

Any sort of discrimination is strictly prohibited and unacceptable. I will follow up with the university about any cases. Everyone is, and should feel, included.

Expectations

Of you

I expect you to start on course work early, to follow the Coding Assistance Checklist, to be prepared with questions and do the readings for course time (such as questions on the most confusing point), to attend lecture, to communicate about inability about deadlines ASAP, and to ask for help when you need it.

Of me

I will only give assignments and problems if I believe they will help you understand the material and/or will be applicable in future life. I am most likely available by email from 9:00am-5:00pm central time. I will always do my best to respond within 24 hours. I will ask for mid-semester anonymous feedback on the course and adjust accordingly. I will record lectures and provide them to students with excused absences.

Grading

GPA	Letter	Percentage
4.0 & 🛨	A+	$[97\%, \infty)$
4.0	A	[93%, 97%)
3.7	A-	[90%, 93%)
3.3	B+	[87%, 90%)
3.0	В	[83%, 87%)
2.7	В-	[80%, 83%)
2.3	C+	[77%, 80%)
2.0	\mathbf{C}	[73%, 77%)
1.7	C-	[70%, 73%)
1.3	D+	[67%, 70%)
1.0	D	[60%, 67%)
0.0	F	[0, 60%)

The final grade is broken down into **five homework assignments** to apply the concepts learned in class; **two exams** that are non-cumulative; and a replication-based **final project**.

Homework		Exams		Final Project	
0: R Markdown Basics ()	10%	RE & IV	20%	Replication	10%
1: Randomized Experiments (RE)	10%	RDD & Dil	20%		
2: Instrumental Variables (IV)	10%				
3: Regression Discontinuity Design (RDD)	10%				
4: Difference-in-Differences (DiD)	10%				
Total:	50%		40%		10%

See the Tentative Schedule for tentative due dates.

Grading FAQs

Can I work together with my classmate?

Yes. If you work with another student on **homework assignments**, you must write up your own solutions and write "Collaborated with (insert_peer's_name_here)" on the top of your assignment. I encourage you to try the problems on your own first, however.

You may also work with a partner on the **final project** if you get prior approval from the instructor. Both partners receive the same grade.

Will there be a curve?



But what about extra credit?

- Each instructor endorsed answer on Piazza will add 0.2% to your final grade at the end of the semester.
- If I start a non-blackboard lecture without recording and you verbally remind me, I will give you a 1% bonus to your final grade.

Are there late assignment penalties?

Yep. However, there are penalties:

Lateness	Total Possible Credit
(0, 1 hour]	90% credit
(1 hour, 2 days]	75% credit
(2 days, 1 week]	50% credit
$(1 \text{ week}, \infty]$	0% credit

Can I provide homework solutions for partial credit?

Yes, for up to 50% of the points you missed.

- Original homework assignments are return within one week of the due date.
- You have one week to provide solutions (i.e. due two weeks after the original due date)
- Late penalties still apply.

Can I ask for a regrade?

Sure. All regrade requests must be submitted in writing to the instructor **no more than one week after** the assignment has been graded. The request must be written (e.g. email) and include a detailed summary of why you believe the grade they received was incorrect. I will regrade the entire assignment, so the **grade may go up or down**. Consequently, you should only request a regrade if they are very confident that the original grade they received was incorrect.

Policies

Make-up Exams

Students must present a letter from the Dean's Office justifying their absence, otherwise, they will receive a zero on the missed exam. There are no make-up exams.

Attendance Policy

Attendance is highly encourage. Any content delivered during lecture may appear on homework assignments or exams, regardless of the presence of said content on distributed material.

Student Code pertaining to student attendance.

Office of the Dean of Students helps to assist students navigate the Student Code and course policies. If students will be absent for an extended period of time, they should discuss with this office.

Piazza Policy

Students are encouraged to use Piazza for their questions and to help their peers. In doing so, students may not post solutions in any form in <u>public posts</u> whether in a question or response to another student. If you are concerned about this violation, please make a **private post**.

Coding Assistance Checklist

- 1. Read your error code
- 2. ?the_function_you_are_using
- 3. Web search your error code
- 4. Check for your question or ask on Piazza (remember the Piazza Policy)
- 5. Email instructor and/or go to office hours

Academic Assistance

Students are encouraged to utilize the many resources we have throughout campus to assist with academics. We recommend that you seek them out starting early in the semester, not just in times of academic need, in order to develop good study habits and submit work which represents your full academic potential. Many resources may be located on the Economics Website, including information about the Economics Tutoring Center, other tutoring centers.

Academic Integrity

According to the Student Code, "It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions." Please know that it is my responsibility as an instructor to uphold the academic integrity policy of the University, which can be found here.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policies. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity. Read the full Student Code.

Students with Disabilities

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu

DRES Website

Emergency Response Recommendations

Emergency response recommendations.

I encourage you to review this website and the campus building floor plans website within the first 10 days of class.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See the registrar's website for more information on FERPA. Student information and records will not be released to anyone other than the student, unless the student has provided written approval or as required by law. More information may be found here.

Sexual Misconduct Reporting Obligation

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here. Other information about resources and reporting is available here.

Student Support

The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. Please visit their website to find valuable resources and services:

Counseling Center

- Information: 217-333-3704
- Location: Room 206, Student Services Building 610 East John Street, Champaign, IL
- Appointment: Scheduled for same day, recommend calling at 7:50 a.m.

McKinley Mental Health Information:

- 217-333-2705
- Location: 3rd Floor McKinley Health Center 1109 South Lincoln, Urbana, IL
- Hours: 8 a.m. 5 p.m., Monday through Friday Appointment: Scheduled in advance.

The **Emergency Dean** may be reached at (217) 333-0050 and supports students who are experiencing an emergency situation after 5 pm, in which an immediate University response is needed and which cannot wait until the next business day. The Emergency Dean is not a substitute for trained emergency personnel such as 911, Police or Fire. If you are experiencing a life threatening emergency, call 911. Please review the Emergency Dean procedures.

Academic Dates and Deadlines

Students should make note of important academic dates for making changes to their courses (add, drop, credit/no-credit, grade replacement, etc.). Please check with your academic department regarding specific procedures and policies.

Tentative Topics and Schedule

Module 1: Causal Frameworks (F) and Randomized Experiments (RE) Ch. 1–5

- directed acyclic graphs (DAG), potential outcomes, average treatment effects (ATE), average treatment effect on the treated (ATT), randomized experiments, matching, experimental design

Module 2: Instrumental Variables (IV)

Ch. 7

- Omitted variable bias, two-stage least squares (2SLS), weak instruments, local average treatment effects (LATE), intent to treat (ITT) popular IV designs

Module 3: Regression Discontinuity Designs (RDD)

Ch. 6

Common support and extrapolation, continuity assumption, sharp RDD, fuzzy RDD

Module 4: Difference-in-Differences (DiD)

Ch. 8–10

 Panel data, fixed effects, parallel pre-trends, clustered standard errors, event study, differential timing, serial correlation, differential exposure, syntethic controls

All homework assignments are due by 09:30:00 before class.

Mod.	Class	Topic	Assigned	Due
0	Aug. 23 Aug. 25	Syllabus & overview How to •		
	Aug. 30 Sept. 1	How to 6 Review 1: probability		
	Sept. 6 Sept. 8	Review 2: regression theory Review 3: regression •	HW0: 😱	
1	Sept. 13 Sept. 15	DAG potential outcomes		HW0: 😱
	-	RE 1: randomization RE 2: subclassification and matching		
	-	Dealing with Data 1 [LAB] Dealing with Data 2		
2	Oct 4. Oct. 6	RE 3: propensity scores RE 4: [LAB] designing experiments	HW1: RE	
	Oct. 11 Oct. 13	IV 1: 2SLS IV 2: [LAB] shift-shares & lotteries		HW1: RE

3	Oct. 18 Oct. 20	IV 3: LATE IV 4: [LAB] ITT and ATT	HW2: IV	
	Oct. 25 Oct. 27	RDD 1: sharp Review: Exam 1		HW2: IV
	Nov. 1 Nov. 3	Exam 1 - Frameworks, RE, and IV CANCELLED		
4	Nov. 8 Nov. 10	NO CLASS - Election Day CANCELLED		Vote
	Nov. 15 Nov. 17	RDD 2: [LAB] fuzzy DiD 1: 2×2	HW3: RDD	
	Nov. 22 Nov. 24	NO CLASS - Break NO CLASS - It's still break	Sleep Relax	
	Nov. 29 Dec. 1	DiD 2: differential exposure DiD 3: differential timing	HW4: DiD Final Project	HW3: RDD
	Dec. 6 Dec. 8 Dec. 9	Review: Exam 2 NO CLASS Reading Day (Friday 1:30 PM - 4:30 PM) Exam 2	- RDD and DiD	HW4: DiD
	Dec. 13	(Tuesday) 9:30 AM		Final Project