ECON 480-3
INTRODUCTION TO ECONOMETRICS
SPRING 2026

Instruction:

Lecture: **M-W** 1:30PM – 3:20PM, in KGH 1410
Discussion: **Th** 1:00PM – 2:50PM (1410) & **F** 9:00AM – 10:50AM (1410)

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Course Description: This course is the third quarter of the first year graduate econometric sequence. It focuses on the interpretation of commonly used estimands and some of the most essential tools in the realm of causal inference within the context of complex economic data. Through a rigorous blend of theoretical frameworks and practical applications, students will explore a range of econometric techniques essential for drawing reliable causal conclusions from experimental and observational data. Topics covered include regression analysis, identification and estimation of treatment effects under a variety of assumptions (including results that lead to partial identification), and instrumental variables in heterogeneous models (including Roy models, local average treatment effects, marginal treatment effects, and monotone IV). In addition, it covers popular econometrics tools like panel data analysis, difference in differences, and regression discontinuity designs. The course will also explore the use of several resampling tools like the bootstrap, subsampling, and the wild bootstrap for clustered data. This class emphasizes critical thinking and methodological rigor, hopefully equipping students with the tools necessary to address research questions in a conceptually clear manner. The course assumes that students are comfortable with the kind of asymptotic theory covered in 480-1, and the estimation methods covered in 480-2, so the focus of the discussion will be on issues of identification, interpretation, and practical implementation.

Grading: The class grade consists of problem sets (submitted via Canvas), a midterm exam on **Wednesday May 6th in class**, and a final exam on **Friday June 12th from 9AM to 11AM**. The weighting scheme for the final grade will be as follows:

Problem Sets:	15%
Midterm Exam:	40%
Final Exam:	45%

- **Problem sets**: Problem sets are due at **12 PM** on their due date and must be submitted via CANVAS. Late problem sets are not accepted, and there are no make-up problem sets. You may work in **groups of 2** as long as both members are clearly listed at the top of every copy and each group member **uploads their own copy**.
- **Exams:** There are no make-up exams and no rescheduling. No calculators, cell phones, laptops, or other electronic devices may be used. The exam is closed-book but we will provide a print out of an official cheat sheet the day of the exam. Student will have access to the content of this cheatsheet at least one week before each exam.

Discussions: There are two types of discussion sessions in this course. The **Friday** discussion covers extensions of material covered in lecture and goes over exam and problem set questions. The **Thursday** discussion works "on-demand" and is intended as a review or background session that goes over simpler problems and concepts suggested by you earlier in the week. Talk to the TAs to determine if both, any, or none are appropriate for you.

Readings: I will provide lecture notes every week with related references you are supposed to read. There is no textbook for this course since the topics are standard and covered in many textbooks. My recommendations are the following:

- Read parts of Econometrics (2022) by Bruce E. Hansen. The book is available for purchase. A somewhat outdated pdf version is available on Canvas.
- Consult parts of Mostly Harmless Econometrics (2009) by Joshua D. Angrist and Jörn-Steffen Pischke.
- The lectures notes by Stefan Wager and Peng Ding, both available con Canvas, are both excellent sources for many of the topics we cover in the class.
- Additional useful resources are available on Canvas.

Software: The problem sets will require you to use R, MATLAB, Python, or equivalent. For many problems you will also be able to use Stata. R is free and has the advantage that (a) it contains most of the desired tools pre-programmed, (b) it allows you to code your

own, and (c) it is widely used in academia and industry. Programming languages will not be taught during class. You are expected to determine on your own what you need to learn to complete the programming assignments. In the process of doing this, you will teach yourself how to teach yourself, which is a crucial skill for success in graduate school. Related useful skills you may gain are "Google-Fu" and the ability to RTFM.

Attendance: Attendance is not mandatory but it determines your ability to access office hours. Only students that routinely come to class may come to office hours. This includes meetings to request feedback after the midterm exam.

Computer Research Support: The university offers a wide range of computational resources that are available to students. They all require the student to first apply for an account, but doing so is usually straightforward. All students registered to this class will have access to a Quest allocation. Quest is the largest computer cluster at Northwestern (http://www.it.northwestern.edu/research/user-services/quest/). Kellogg students also have access to the Kellogg Unix server (http://www.kellogg.northwestern.edu/rs/). All these servers provide access to a wide selection of analytical software, including the ones mentioned above, and allow users to run multiple jobs simultaneously. If you prefer to install the software on your own computer, student discounts are available for Stata and MATLAB. More detailed information about how to use this resources will be provided during the first discussion session on **Thursday April 2nd**.

AccessibleNU: Any student requesting accommodations related to a disability or other condition is required to register with AccessibleNU (847-467-5530) and provide professors with an accommodation notification from AccessibleNU, preferably within the first two weeks of class. All information will remain confidential.

Lecture Recordings: Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact AccessibleNU. Unauthorized use of classroom recordings — including distributing or posting them — is also prohibited. Under the University's Copyright Policy, faculty own the copyright to instructional materials — including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display or distribute these materials.

Jeez! Anything else?: Yes. The specifics of this course syllabus are subject to change in the case of unforeseen circumstances. I will notify students of any changes as soon as possible. Students will be responsible for abiding by the changes. In addition, you should note that Northwestern has expectations for all students taking classes, outlined here:
https://www.registrar.northwestern.edu/registration-graduation/northwestern-university-syllabus-standards.html

Tentative Course Schedule: Econ 480-3 Spring 2026

Lecture	Date	Day	Topics	PS out	PS in
			Part I: Causality and Conditional Independence		
1	March 31	Tu	Causality and Potential Outcomes	–	–
2	April 1	W	Linear Regression I	1	–
3	April 6	M	Linear Regression II	–	–
4	April 8	W	Selection on Observables I	–	–
5	April 13	M	Selection on Observables II	2	1
6	April 15	W	Augmented IPW & Double Robustness	–	–
			Part II: Causality and Endogeneity		
7	April 20	M	Endogeneity and IV	–	–
8	April 22	W	Properties of TSLS	3	2
9	April 27	M	Heterogeneous Treatment Effects	–	–
10	April 29	W	Marginal Treatment Effects	–	–
11	May 4	M	Partial Identified Causal Effects	–	–
-	**MAY 6**	W	**Midterm Exam**	4	–
			Part III: Widespread Causal Inference Designs		
12	May 11	M	Panel Data	–	–
13	May 13	W	Difference in Differences I	–	–
14	May 18	M	Difference in Differences II	5	4
15	May 20	W	Regression Discontinuity Design	–	–
			Part IV: Resampling Methods		
16	May 27	W	Randomization Tests	–	–
17	June 1	M	Bootstrap	6	5
18	June 3	W	Inference with Clustered Data	–	–
–	**June 12**	**F**	**FINAL EXAM at 9AM**	–	–