Instructor: EunYi Chung   *Schedule:* MW 11:00AM-12:20PM
Office: 220 David Kinley Hall (DKH)   123 DKH
Office Hours: T 2:30PM-4:00PM (Zoom)
          or by appointment
Contact: eunyi@illinois.edu
Grader: Jieun Lee (jieun2@illinois.edu)

ECON474: ECONOMETTICS OF POLICY EVALUATIONS
Spring 2022

Course Description

The goal of this course is to develop the basic tools necessary to understand and use modern econometric methods. The course will focus on how one goes about estimating and making inferences for causal effects by paying special attention to empirical cases dealing with policy-relevant issues. Topics that will be covered throughout the semester include, but are not limited to randomized experiments, observational studies, matching methods, differences-in-differences, synthetic control, regression discontinuity design, instrumental variables, and local average treatment effects. We discuss the theoretical aspects of various methods and examine how they are applied in the literature.

Course Notes

- *Number of Credits:* 3 or 4 (MSPE)
- *Pre-Requisites:* ECON 202, 203 and 302 are strongly recommended as prerequisites for this course. If you have not mastered the material covered in those courses, you may find this course rather difficult. It is assumed that all students have knowledge in calculus, linear algebra, and basic statistics and econometrics. In particular, students should be familiar with basic multivariate calculus (first and second derivatives and how to obtain them), matrices and matrix operations, basic properties of random variables, calculating expectations, variances, correlations, conditional expectations and conditional variances, and multiple linear regressions. Although we will review some material, it will be brief. Thus, if you do not have sufficient mathematical and statistical background and preparation, you may struggle with the materials covered in this course and should consider taking this course after strengthening these skills.
- *Frequency & Duration:* MW 11:00AM-12:20PM
- Each student is expected to devote *at least* 9 hours per week learning the topics of the course through readings and lectures, and students are expected to spend an additional 10-20 hours on weeks when assignments or class projects are due.

Course Goals

By the end of the course, students will have…

- developed the basic tools necessary to understand and use modern econometric methods
- understood identification and inference of each method covered in class

- fostered an ability to read, comprehend, and analyze scholarly works on theoretical and empirical econometrics
- learned to use the statistical software package called R to conduct your own empirical research
- advanced your empirical research dealing with treatment effects
- learned to engage with contemporary issues based on the theoretical, empirical, and analytical tools covered in this course
- strengthened your presentation and writing skills while working in a group

Required Materials

Supplemental: There will be no ``required'' textbook for this class. All the relevant materials including lecture notes and problem sets will be available on Canvas (http://canvas.illinois.edu). Other material will be distributed in class.
The recommended textbooks for this course are:

- "Mastering 'Metrics: The Path from Cause to Effect," by J. Angrist and S. Pischke (2014).
- "Mostly Harmless Econometrics," by J. Angrist and S. Pischke (2008).
- "Trustworthy Online Controlled Experiments: A Practical Guide to A/B Testing," by R Kohavi, D. Tang, and Y. Xu (2020).
- "Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction," by D. Rubin and G. Imbens (2015).
- "Design of Observational Studies," by P. Rosenbaum (2010). You can download the e-version from link.springer.com/book/10.1007/978-1-4419-1213-8/page/1.

You will learn how to use the statistical software package called **R**, which will be used in class and for your problem sets. Students are welcome to use other statistical packages, but the solutions for the problem sets will be provided using **R**. Please down R(http://ftp.ussg.iu.edu/CRAN/) and RStudio (rstudio.com).
Although you will learn to use R in this course, if you are interested in learning more outside of the class, here are some free tutorials. All three cover similar materials:

- The R Guide by Owen: http://cran.r-project.org/doc/contrib/Owen-TheRGuide.pdf
- An Introduction to R by Venables and Smith: http://cran.r-project.org/doc/manuals/R-intro.pdf
- Simple R by Verzani: http://cran.r-project.org/doc/contrib/Verzani-SimpleR.pdf

Course Requirements

Scoring

	3 credits	4 credits
5 Assignments	200 Total Points	200 Total Points
Midterm	200 Total Points	200 Total Points
Final Exam	300 Total Points	300 Total Points
Group Presentation and Project	300 Total Points	300 Total Points
Individual Presentation	(extra credit)	200 Total Points
Total	1000	1200

Your grade will be calculated as a percentage of these points. The final grade for the class will be scored out of 1,000 points (1,200 for graduate students). To calculate your grade before all exams and assignments are finalized, divide the total points you have scored in the course so far by the total amount of potential points. Multiply that number by 100 and round to the nearest integer then compare that number to the Plus/Minus Grade Cutoffs below.

Grading Scale

A+	100-97.00	**C+**	77.00-79.99	**F**	0-59.99
A	93.00-96.99	**C**	73.00-76.99		
A-	90.00-92.99	**C-**	70.00-72.99		
B+	87.00-89.99	**D+**	67.00-69.99		
B	83.00-86.99	**D**	63.00-66.99		
B-	80.00-82.99	**D-**	60.00-62.99		

Student Learning Objectives

As a preeminent public land grant university, the University of Illinois at Urbana-Champaign serves society and transforms lives, producing leaders who value excellence, innovation, inclusivity, stewardship, and accountability. Through a uniquely Illinois experience that takes place both inside and outside the classroom, our graduates are broadly educated yet have expertise in specific fields of study. They are intellectually curious, having the ability to think critically and imaginatively. They exhibit a consciousness of global connectedness and interdependencies, possess a critical appreciation of social and cultural communities, and participate knowledgeably and responsibly in civic life. Ultimately, our graduates understand how to employ knowledge in order to generate new ideas, discoveries, and solutions, and are adept in building and sustaining productive relationships in order to create positive change.

The course will foster the following SLOs during the semester: (1) intellectual reasoning and knowledge to acquire broad and deep knowledge across academic disciplines and fields, (2) creative inquiry and discovery to promote inquiry, discover solutions, and generate new ideas and creative works, (4) social awareness and cultural understanding to develop a critical and reflective orientation toward such social and cultural differences as race, indigeneity, gender,

class, sexuality, language, and disability, and (5) global consciousness to discover how complex, interdependent global systems natural, environmental, social, cultural, economic, and political – affect and are affected by the local identities and ethical choices of individuals and institutions.

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: http://studentcode.illinois.edu/article1_part4_1-401.html

Assignment Policies:

All assignments are to be turned on Canvas. Late assignments receive *no* credit. You are encouraged to work as a group with your classmates although you have to hand in your own solutions. The assignment portion of your grade will be the average of all your assignment scores.

Exam Absences

Please refer to the university's study code regarding class attendance found here: https://studentcode.illinois.edu/article1/part5/1-501/. As noted in the provided link, the authority to excuse absences rests with the course instructor. Make up exams are not permitted and are only made in cases of rare emergencies. Emergencies which warrant an absence letter include, but are not limited to prolonged illnesses or injury of 3 days or more, life threatening or serious illness or injury or death of an immediate family member, a student's religious beliefs, observances, and practices, etc.

If you deem that your circumstances constitute an emergency and you are unable to attend class to take a scheduled exam, you must immediately contact the Student Assistance Center in the Office of the Dean of Students to request an absence letter. This letter should be accompanied by supporting evidence, such as a supplementary absence letter by relevant parties (e.g. family doctor, university official, etc), detailing the reason why you are unable to attend class and take the exam. For prolonged illnesses, formal documentation by a health care provider who provided treatment to the student must be submitted on the provider's letterhead. Minor illnesses will not be a justifiable excuse to miss a scheduled exam. Notes from McKinley or CampusTown Urgent Care are not considered medical excuses and will not be accepted.

Students with chronic health conditions and/or disabilities that may affect their class attendance should register with Disability Resources and Educational Services (DRES), in accordance with § 1-110.

Final Exam Conflict Policy

From the University's final exam policy:

- Any student having more than two consecutive final examinations is entitled to reschedule if he or she takes the following actions no later than the last day of class:
  - o The student must investigate whether a conflict examination is being held at another time for any of the examinations involved.
  - o If a conflict examination has been scheduled for any of the courses, the student must take one or more of these conflict examinations. If conflict examinations are offered for more than one course, the student must take the conflict for the course that has the largest number of students.
  - o If no conflict examinations have been scheduled, the student must contact the instructor of the course with the largest number of students. The contact must be made by the last day of classes, and that instructor must provide a makeup.
  - o Normally in a semester several combined-sections, conflict, and non-combined examinations are given at the same time. As a guide to resolving conflicts, an order of priority has been established within each examination period, and a student should resolve a conflict using the published examination schedules and the following priority guidelines.
    - ▪ National and state professional examinations (e.g., CPA, actuarial science, Architecture Registration Examination) take priority over campus final examinations. An instructor must offer a conflict examination to a student scheduled to take a national or state professional examination and a campus final examination at the same time.
    - ▪ A non-combined course examination has precedence over any combined-sections or conflict examination.
    - ▪ A department offering a combined-sections final examination must provide a conflict examination if required to accommodate student conflicts.

The University's final exam policy is available at:
http://studentcode.illinois.edu/article3_part2_3-201.html

Student Assistance

For personal issues, contact the Counseling Center by calling (217)333-3704. More information is available at http://www.counselingcenter.illinois.edu/. In addition, the Counseling Center provides study skills resources. See http://www.counselingcenter.illinois.edu/outreach-consultation/first-generation-students/studying-time-management-writing-skills/ for more information. If you feel you need help with your writing skills, contact the Writers Workshop at the Center for Writing Studies by calling (217)333-8796. You can find additional information online at http://www.cws.illinois.edu/workshop/.

Students with Disabilities

The Division of Disability Resources and Educational Services (DRES) has been designated by the University as the primary office to guide, counsel, and assist students with disabilities. DRES works to provide a variety of academic accommodations and support services to allow students

equal access to their courses and campus activities. DRES and the student will discuss the interaction between the disability and the academic environment in order to determine necessary academic adjustments and modifications. If you already receive service through DRES and require accommodations for this class, make an appointment with me as soon as possible to discuss your approved accommodation needs. Please bring your accommodation letter with you. I will hold any information you share with me in the strictest confidence. If you have not contacted DRES and need accommodations (note-taking assistance, extended exam times, etc), DRES will require appropriate documentation. Please visit https://www.disability.illinios.edu or reach them at (217)333-4603.

Emergency Response Recommendations

The Department of Homeland Security and the University of Illinois at Urbana-Champaign Office of Campus Emergency Planning recommend the following three responses to any emergency on campus: RUN > HIDE > FIGHT. Only follow these actions if safe to do so. When in doubt, follow your instincts – you are your own best advocate. The university maintains guidelines for emergency responses.

Please the following links:
http://police.illinois.edu/emergency/response/
http://illinois.edu/cms/2251/general_emergency_response_recommendations_8_16_13_final.docx

Floor plans are available at http://police.illinois.edu/emergencyplanning/floorplans/

COURSE SCHEDULE
(tentative)

WEEK	DATE	DUE	TITLE
1	JAN 19		*Class Introduction: Causal Inference*
2	JAN 24 JAN 26		*Rubin's Causal Model* *Randomized Experiments & OLS*
3	JAN 31 FEB 2	Problem Set I	*R1* *Regression Method*
4	FEB 7 FEB 9	Problem Set II	*R2* *Observational Studies*
5	FEB 14 FEB 16		*Matching* *R3*
6	FEB 21 FEB 23	Problem Set III	*Propensity Score* *R4*
7	FEB 28 MAR 2	Problem Set IV	*Difference-in-differences* *Synthetic Control*
8	MAR 7 MAR 9		*Practice Midterm* ***Midterm (MAR 9)***
9	MAR 14 MAR 16		***SPRING BREAK***
10	MAR 21 MAR 23		*Regression Discontinuity Design* *Group meetings*
11	MAR 28 MAR 30		*Instrumental Variables* *Local Average Treatment Effects I*
12	APR 4 APR 6	Problem Set V	*No Class* *Local Average Treatment Effects II*
13	APR 11 APR 13		*Practice Final* ***Final (APR 13)***
14	APR 18 APR 20		*Group meetings* *Student Presentation I*
15	APR 25 APR 27		*Student Presentations II* *Student Presentations III*
16	MAY 2 MAY 4		*Student Presentations IV* *Student Presentations V*
17	MAY 11	4PM	****Final Research Paper DUE****