ECON 474: Econometrics of Policy Evaluation

University of Illinois at Urbana-Champaign
College of Liberal Arts & Sciences
Department of Economics

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TR 9:30AM – 10:50AM

Communication:

E-mail: eunyi@illinois.edu
Office Hours: W 8:00AM-9:00AM (sign-up via Compass required)
T 9:30AM-10:00AM (Q&A Zoom meetings)
Or by appointment
Grader: Shan He (shanhe4@illinois.edu)

Prerequisites:
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.

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.

Learning Resources:
Supplemental: There will be no ``required'' textbook for this class. All the relevant materials including lecture notes and problem sets will be available on Illinois Compass 2G (http://compass.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

Student Assessment:

Scoring

	3 credits	4 credits
5 Assignments	200 Total Points	200 Total Points
EXAM I	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.

Plus/Minus Grade Cutoffs

A+ ≥ 97	B+ ≥ 87	C+ ≥ 77	D+ ≥ 67	60 > F
97 > A ≥ 94	87 > B ≥ 84	77 > C ≥ 74	67 > D ≥ 64	
94 > A- ≥ 90	84 > B- ≥ 80	74 > C- ≥ 70	64 > D- ≥ 60	

Assessment Policies

Assignment Policy:

All assignments are to be turned on Compass. 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 Policy:

In the event that a student misses one of the exams, the instructor reserves the right to give the student a zero on that exam. There are no make-up exams.

Important Dates:

Problem Set Dues:

Problem Set1: Thursday February 11th
Problem Set2: Thursday February 18th
Problem Set3: Thursday March 4th
Problem Set4: Thursday March 25th
Problem Set5: Thursday April 8th

Exam Schedule:

EXAM I: Tuesday March 9th, synchronous
Final Exam: Tuesday May 4th, synchronous
Final Project Paper Due: Sunday May 9th 5PM CT

Exam dates and times are *not* flexible. The only exception to this rule is a death in the family or illness requiring immediate attention from a physician. See Article 1 - Student Rights And Responsibilities (for more details on these issues at:
http://www.admin.illinois.edu/policy/Code/article1_part5_1-501.html

Final Project:

The goal of conducting a final project is to learn how to develop a research paper using the econometric techniques we learned in class. This will require you to think critically and consider how to develop a research idea into an actual project. At the end of the semester, you will present your proposal in class and submit your group paper. You can work as a group no larger than 4 individuals - More details later.

Presentation:

For those who are taking this class for 4 credits (or those who want extra credits), you will present a paper that is related to a topic/ econometric method covered in class. You may choose a paper on your own based on your interest (and get a confirmation with me) or I can assign you a paper of your interest. You will record your presentation and send me the link via Kaltura media(https://mediaspace.illinois.edu/).

Final Exam Conflict Policy:

From the University's final exam policy:

- Any student having more than two consecutive final examinations is entitled to rescheduling as follows if he or she takes the following action no later than the last day of classes:
    - The student must investigate whether a conflict examination is being held at another time for any of the examinations involved.
    - 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.
    - If no conflict examinations have been scheduled, the student must contact the instructor of the course having the largest number of students. The contact must be made no later than the last day of classes, and that instructor must provide a makeup examination.
    - Normally in a semester several combined-sections, conflict, and noncombined 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 noncombined 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

Emergency Response Recommendations:
The university maintains guidelines for emergency responses. A list of recommendations when to evacuate and when to find shelter are available at:
http://illinois.edu/cms/2251/general_emergency_response_recommendations_8_16_13_final.docx
Floor plans for specific buildings are available at:
http://police.illinois.edu/emergencyplanning/floorplans/

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

Academic Integrity:
"The University has the responsibility for maintaining academic integrity so as to protect the quality of education and research on our campus and to protect those who depend upon our integrity.

Expectations of Students. 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. Students have been given notice of this Part by virtue of its publication. Regardless of whether a student has actually read this Part, a student is charged with knowledge of it. Ignorance is not a defense."

The University's full academic integrity policy is available at:
http://studentcode.illinois.edu/article1_part4_1-401.html

(Tentative) COURSE SCHEDULE

WEEK	DATE	TITLE	LECTURE	Note
1	Jan 26 Jan 28	*Class Introduction*: Causal Inference Rubin's Causal Model	**Synchronous** Asynchronous	
2	Feb 2 Feb 4	Basic Statistics Randomized Experiments & OLS	Asynchronous Asynchronous	**(9:30-10:00am)**
3	Feb 9 Feb 11	R1 Regression Method	**Synchronous** Asynchronous	Problem Set I
4	Feb 16 Feb 18	R2 Fisher's Exact Test	**Synchronous** Asynchronous	Problem Set II
5	Feb 23 Feb 25	Observational Studies Matching	Asynchronous Asynchronous	**(9:30-10:00am)**
6	Mar 2 Mar 4	R3 Propensity Score	**Synchronous** Asynchronous	Problem Set III
7	Mar 9 Mar 11	**EXAM I** Group Meetings	**Synchronous** **Synchronous**	
8	Mar 16 Mar 18	R4 DID	**Synchronous** Asynchronous	
9	Mar 23 Mar 25	Synthetic Control Regression Discontinuity Design	Asynchronous Asynchronous	**(9:30-10:00am)** Problem Set IV
10	Mar 30 April 1	Group Meetings Instrumental Variables	**Synchronous** Asynchronous	
11	April 6 April 8	Local Average Treatment Effects	Asynchronous Asynchronous	**(9:30-10:00am)** Problem Set V
12	April 13 April 15	No Instruction Day Student Presentations	N/A **Synchronous**	
13	April 20 April 22	Student Presentations	**Synchronous** **Synchronous**	
14	April 27 April 29	Student Presentations	**Synchronous** **Synchronous**	
15	May 4	**FINAL EXAM**	**Synchronous**	
16	May 9	**FINAL PROJECT PAPER DUE (5PM)**		

Tuesdays 9:30-10:00am (when we don't have synchronous lectures) will be synchronous for Q&A.