

Causal Inference

ECON 4910 | 3 credit hours

Spring 2021

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COURSE DESCRIPTION

Students will learn modern economic analysis, which centers around causal inference – how X causes Y. Students will learn how economists and social scientists identify causal effects without experiments, how to diagram causality, and how to implement casual methods using R.

LEARNING OUTCOMES

On successful completion of this course (i.e. by passing this course), you will be able to

- Understand the problems of causal inference and how economists try to come to causal conclusions using observational (non-experimental) data.
- Learn how to diagram an economic model in order to be able to determine how effects can be identified.
- Learn the standard statistical approaches (causal inference methods) for identifying causal effects.
- Learn how to use the R statistical programming language to interact with economic data and apply causal inference methods.

TEXTS AND MATERIALS

- Required: The Effect: An Introduction to Research Design and Causality, by me. This will be available on Canvas for free.
- Recommended: Causal Inference: the Mixtape. Available [online for free](#), or In paper format.
- Additional [resources](#) and [videos](#) on R programming and econometrics
- [Mastering Metrics](#) and the [associated video series](#), an accessible textbook
- If you want to go a bit fancier, Counterfactuals and Causal Inference by Morgan & Winship

COURSE OUTLINE

Schedule	Topic	Reading, Assignment
Week 1	Describing Variables and Relationships	Reading, do before second class: The Effect, Chs. 3 and 4, you can skim if this is all familiar Chapter 13 will also come in handy and you might want to take a look/refer back to it but it's very long and not assigned reading.
Week 2	Research Design and Causality <i>What is causality?</i> <i>The problem of causal inference</i> <i>Models and causality</i>	Reading, do before class: The Effect, Chs. 2 and 5 Assignment: Week 2 Homework, Due Monday of Week 3
Week 3	Causal Diagrams Part 1 <i>Controlling for a variable</i> <i>Drawing causal diagrams</i> <i>Dagitty.net</i> <i>Causal Inference in the News assignment, due [Day]</i>	Reading, do before class: The Effect, Chs. 6 and 7, Dagitty cheat sheet (on Canvas) Assignment: Week 3 Homework, Due Monday of Week 4
Week 4	Causal Diagrams Part 2, Concepts Midterm <i>Controlling for variables</i> <i>Front-door paths</i> <i>Collider variables</i>	Reading, do before class: The Effect, Ch. 8 Exam: Take the Causal Concepts Exam by Monday of Week 5 Assignment: Causal Inference in the News, Due Monday of Week 5
Week 5	Within-Variation Designs: Fixed Effects and Difference-in-Difference <i>Fixed Effects</i> <i>Difference-in-Differences</i>	Reading, do before class: The Effect, Chapter 15, skipping "How the Pros Do It" Assignment: Week 5 Homework, due Monday of Week 6

Schedule	Topic	Reading, Assignment
Week 6	Within-Variation Designs: Difference-in-Differences <i>Difference-in-differences</i>	Reading, do before class: The Effect, Chapter 17 Kessler & Roth (2014), Sections I, II, V Assignment: Week 6 Homework, due Monday of Week 7 Assignment: Published paper analysis paper selection, due Monday of Week 7
Week 7	Front-Door Methods: Regression Discontinuity <i>Regression Discontinuity</i>	Reading, do before class: The Effect, Chapter 19 Assignment: Week 7 Homework, due Monday of Week 8
Week 8	Front-Door Methods: RDD and Instrumental Variables <i>Regression Discontinuity</i> <i>Instrumental variables</i>	Reading, do before class: Zimmerman 2014, skip Results D and E, The Effect, Chapter 18 Assignment: Week 8 Homework, due Monday of Week 9 Assignment: Published paper analysis milestone, due Monday of Week 9
Week 9	Instrumental Variables and Single-Case Methods <i>Instrumental variables</i> <i>Event studies</i> <i>Synthetic control</i>	Reading, do before class: Causal Inference: The Mixtape Chapter 9 Assignment: Research Design Paper, due Monday of Week 10
Week 10	Treatment Effects <i>Average treatment effects</i> <i>Weighted treatment effects</i> <i>Determining treatment effects</i>	Reading, do before class: The Effect, Ch 10 Due: Week 10 Homework, due Monday of Finals Week
Finals Week	Causal Methods Exam	Due: Published paper analysis, due Saturday of Finals Week

EVALUATION AND GRADING

Assignment	Percentage
Homework	21%
Published Paper Analysis	17%
Causal Concepts Exam	17%
Causal Methods Exam	17%
Research Design	16%
Causal Inference in the News	12%
Total	100%

EXTRA CREDIT POLICY

For extra credit, you may complete a second Published Paper Analysis - for this version you may turn in a bullet-point list of your responses to the questions rather than something in written-paper format. A good job on this will increase your course grade by 2%.

You may also get an additional 1% added on to your grade for submitting (and having accepted) a new page, or a new language added to an existing page, at the Library of Statistical Techniques (<https://lost-stats.github.io/>)

Point scale	Letter grade	Point scale	Letter grade
94.0% and higher	A	77.0% - 79.9%	C+
90.0% - 93.9%	A-	74.0% - 76.9%	C
87.0% - 89.9%	B+	70.0% - 73.9%	C-
84.0% - 86.9%	B		
80.0% - 83.9%	B-		

COURSE POLICIES

ATTENDANCE

Attendance in an online course is evidenced by logging into, and being an active participant, in our online course site. Active participation is an essential and intrinsic element of the education process. Absence affects the learning experience and erodes the program's norms for quality. Inactivity in the course may result in a grade reduction at the discretion of the instructor(s).

INTERNET ACCESS

We will use a variety of online applications to communicate and collaborate. As such, you will need a reliable, high-speed Internet connection for the duration of this course. If you are traveling to countries such as China, Vietnam, Saudi Arabia, Iran, Burma, and others, some content in this course may be blocked. Please contact me immediately if you will be traveling to a country that may block Internet access during any portion of this class.

LATE WORK

Assignments must be submitted by the set deadlines. Since professors block out times in their schedules specifically for grading your work, the MBA program faculty have established a policy of not accepting late work. We also understand, however, how demanding your work and school and life are as well. As such, we do allow late work to be accepted with a 10%/day grade reduction (including weekends). The deduction will be taken from the maximum number of points available on the assignment. Exceptions or extensions or modifications to these penalties may be made only in the event of rare and extenuating circumstances. Every effort should be made to let your professor(s) know about your extenuating circumstances before the assignment is due.

UNIVERSITY RESOURCES & POLICIES

ACADEMIC RESOURCES

- [Library and Learning Commons](#) - Research Services, Learning Assistance, Writing Center, Math Lab, Media Production Center
- [Academic Integrity](#)

ACADEMIC POLICIES

- [Academic Integrity](#)
- [Academic Grading Grievance Policy](#)
- **Support for Students with Disabilities**
If you have, or think you may have, a disability (including an “invisible disability” such as a learning disability, a chronic health problem, or a mental health condition) that interferes with your performance as a student in this class, you

are encouraged to arrange support services and/or accommodations through Disabilities Services staff located in Loyola 100, (206) 296-5740. Disability-based adjustments to course expectations can be arranged only through this process.

- **Notice Regarding Religious Accommodations**

It is the policy of Seattle University to reasonably accommodate students who, due to the observance of religious holidays, expect to be absent or endure a significant hardship during certain days of their academic course or program. Please see, [Policy on Religious Accommodations for Students](#).

- **Office of Institutional Equity**

Title IX of the Education Amendments of 1972 (Title IX) prohibits discrimination based on sex in educational programs or activities that receive Federal financial assistance. This prohibition includes sexual misconduct, which encompasses sexual harassment and sexual violence. Seattle U remains committed to providing a safe and equitable learning, living, and working environment. Seattle U offers emergency, medical, and other support resources, as well as assistance with safety and support measures, to community members who have experienced or been impacted by sexual misconduct.

Seattle U requires all faculty and staff to notify the University's Title IX Coordinator if they become aware of any incident of sexual misconduct experienced by a student.

For more information, please visit <https://www.seattleu.edu/equity/>. If you have any questions or concerns, you may also directly contact the Title IX Coordinator in the Office of Institutional Equity by email: oiie@seattleu.edu or phone: (206) 296-2824.