HKU BUSINESS SCHOOL
港大經管學院

Inspire·Empower·Lead

1. General Information	
Course Subject	ECON
Course Number	3284
Course Title	Causal Inference
Academic Years	2023-2024
Grading Method	Letter

2. Instructors

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Subclasses: 1A

4. Course Description	
Course Description	This course introduces students to fundamental ideas and important methods in causal inference. Combining statistical theory, scientific principles of research design, and hands-on experience with real data, this course will provide students with a solid basis for being good consumers and practitioners of empirical research in economics and other quantitative social sciences. The course will draw on applications from development, labor, political, and business economics. Other than methodology and computational skills, students will also learn how to think critically through guided reading of original academic papers and extensive class discussion. The primary focus of this course is on application instead of methodological rigor. Hence, the use of mathematics will be limited to elementary algebra and probability. However, students are expected to have taken introductory courses in econometrics/statistics. Because of the emphasis on hands-on data experience, students are expected not to be scared by data and coding. Previous experience with statistical software and knowledge about computer programming is an advantage but not required. Homework assignments are designed to familiarize students with the necessary programing language. The official programming language in this course is R. However, it is acceptable if students want to use Python instead. Both R and Python are freely available. Tutorials about both languages will be offered.
Prerequisites	An introductory course in statistics or econometrics; and an introductory course in microeconomics
Free Elective	Yes

5. Course Objectives

1. Provide students a broad overview of the popular empirical methods in economics and social sciences
2. Enhance students' analytical ability to apply appropriate methods in different contexts
3. Equip students with a basic toolkit that can be directly used for their own research

6. Faculty Learning Goals
Goal 1: Acquisition and internalization of knowledge of the programme discipline
Goal 2: Application and integration of knowledge
Goal 3: Inculcating professionalism
Goal 4: Developing global outlook
Goal 5: Mastering communication skills
Goal 6: Cultivating leadership

7. Course Learning Outcomes						
Course Teaching and Learning Activities	Aligned Faculty Learning Goals					
	1	2	3	4	5	6
CLO1. Gain a solid understanding of the scientific principle of experimental design	✔	✔				
CLO2. Articulate the logic of causal inference	✔	✔			✔	
CLO3. Describe and differentiate between a variety of common research designs that aim to draw causal inference in a wide range of social science applications	✔	✔		✔	✔	
CLO4. Demonstrate facility with implementing the techniques covered in the course using statistical software on real-world datasets	✔	✔	✔			✔

8. Course Teaching and Learning Activities		
Course Teaching and Learning Activities #	Expected Study Hours	Study Load (% of study)
T&L1. Lectures Twelve weeks of three-hour lectures/lab sessions to cover basic topics in causal inference and their applications in social science research	36	30
T&L2. Weekly problem sets Weekly problem sets that allow students to practice using the methods and techniques covered in the course	36	30
T&L3. Tutorial/self-learning sessions Regular tutorial sessions to facilitate the learning of methods and the implementation of techniques	36	30
T&L4. Term project (presentation) A term project (in the form of presentation) to demonstrate students' understanding of a particular method and the ability of implement the relating techniques	12	10
	Total: 120	Total: 100

9. Assessment Methods			
Assessment Methods	Description	Weight %	Aligned Course Learning Outcomes
A1. Problem sets	Four problem sets, each accounting for 5% of the final grade	20%	1

9. Assessment Methods			
A2. Class participation	5% for attendance; 5% for discussion	10%	1,2,3,4
A3. Term project	Students form a team (up to 4 members) to work on a research project, which will be assessed by a presentation (15%) and a final report (15%).	30%	1,2,3,4
A4. Final Exam	a two-hour written exam	40%	1,2,3,4

Assessment Rubrics	
A1. Problem sets	
A+,A,A-	Demonstrate strong evidence of mastering the methods and techniques to solve problems; turn in all problem sets with clear answers in due course
B+,B,B-	Demonstrate reasonable evidence of mastering the methods and techniques to solve problems; turn in all problem sets with clear answers in due course
C+,C,C-	Demonstrate some evidence of the capability of applying the methods and techniques to solve problems; turn in most problem sets in due course
D+,D	Demonstrate limited evidence of the capability of applying the methods and techniques to solve problems; turn in most problem sets in due course
F	Demonstrate little evidence of the capability of applying the methods and techniques to solve problems; Fail to turn in most problem sets in due course
A2. Class participation	
A+,A,A-	Attend class regularly; active engagement in class discussion
B+,B,B-	Attend class regularly; some engagement in class discussion
C+,C,C-	Attend class regularly; limited engagement in class discussion
D+,D	Attend most of the classes; limited engagement in class discussion
F	Fail to attend most of the classes; little engagement in class discussion
A3. Term project	
A+,A,A-	Examines the question/issue/ problem from all important perspectives. Overall logic is clear.
B+,B,B-	Examines the question/issue/ problem from most of the important perspectives. Overall logic is clear.
C+,C,C-	Examines the question/issue/ problem from some of the important perspectives.
D+,D	Examines the question/issue/ problem from some perspective.
F	Fail to examine the question/issue/problem from an important perspective.
A4. Final Exam	
A+,A,A-	A solid understanding of concepts and super ability of solving problems.
B+,B,B-	A solid understanding of concepts and good ability of solving problems.
C+,C,C-	A good understanding of concepts and reasonable ability of solving problems.
D+,D	A fair understanding of concepts but limited ability of solving problems.

Assessment Rubrics	
F	Limited understanding of concepts and little ability of solving problems.

10. Course Grade Descriptors	
A+,A,A-	Strong evidence of superb ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, implement, evaluate and synthesis.
B+,B,B-	Strong evidence of ability to fulfill the intended learning outcomes of the course at all levels of learning: describe, apply, implement, evaluate and synthesis.
C+,C,C-	Evidence of adequate ability to fulfill the intended learning outcomes of the course at low levels of learning; such as describe and apply, but not at high levels of learning such as evaluate and synthesis.
D+,D	Evidence of basic familiarity with the subject.
F	Little evidence of basic familiarity with the subject.

11. Course Content and Tentative Teaching Schedule		
Topic/ Session	Content	Other information
	Week 1. Review of basic statistics and econometrics	
	Weeks 2-3. Randomized controlled trial (RCT)	
	Weeks 4-5. Instrumental variables (IV)	
	Week 6. Regression discontinuity (RD)	
	Weeks 7-8. Panel data and difference-in-differences (DID)	
	Weeks 9-10. Advanced applications	
	Weeks 11-12. Student presentation	

12. Required/Recommended Readings & Online Materials	
Reading	(SC-Mixtape) Cunningham, Scott. 2021. Causal Inference: The Mixtape. Yale University Press. (Book notes are freely available on https://mixtape.scunning.com/.) (AP-MM) Angrist and Pischke. 2014. Mastering Metrics: The Path from Cause to Effect. Princeton, NJ: Princeton University Press.

13. Means / Processes for Student feedback on Course	
✔	Conducting mid-term survey in additional to SETL around the end of the semester
✔	Online response via Moodle site
	Others

14. Course Policy

1. This is an active learning course, and attendance and participation are extremely important. Please observe appropriate classroom etiquette and be considerate to others. In particular, laptop use should be limited to course-related activities, and cell phones are not allowed in class.

2. Students are encouraged to work together in groups to solve the problem sets. However, each student must turn in his or her own homework. Copying another student's answers is not permitted even with consent. All assignments including the term project report must be typewritten.

3. Plagiarism and cheating in exams are serious academic offenses.