

University of Waterloo
Economics 622/722 – Applied Microeconometrics
Winter 2023

Chris Riddell

Email: c2riddell@uwaterloo.ca

Course Description, Goals and Learning Objectives

This course provides an overview of modern empirical techniques for applied-micro fields including labour, education, health, public, and urban (among others). Various examples from these fields are used throughout the course. The focus of the course is on common research designs (and accompanying econometric procedures) in the post-credibility revolution period. Specifically, we focus on research designs that are geared towards estimating (or attempting to estimate) causal effects. This begins with randomized control trials (“RCT”), and then proceeds to various research designs potentially appropriate for non-experimental data. See below for a list of specific methodologies covered. Finally, this course emphasizes the application of the course content to real data using statistical software, and thus the final learning objective is to advance students’ proficiency with statistical analysis (building on previous econometrics courses).

Topics covered (always time permitting) may include the following:

1. Causal inference, the evaluation problem, potential outcomes model
2. Experimental methods (randomized trials)
3. Longitudinal/panel data methods
4. Natural experiments/policy evaluation: Difference-in-differences
5. Natural experiments and RCTs: Instrumental Variables
6. Propensity Score Matching (and Related techniques)
7. Regression Discontinuity

Readings and Software

There is no required textbook for this course. Generally, each topic consists of one or two key journal article accompanied by a short excerpt from a textbook.

SPECIAL NOTE: Data analysis is an important component of this course. We will be using the statistical software package Stata. All information relating to software will be discussed in detail the first class. Please note that you must use Stata -- R cannot be used for this course.

LEARN

- All assignments and data are available at LEARN.

Course Requirements and Assessment

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|---------------------|-----|
| 1. Mini-Assignments | 20% |
| 2. Data Assignments | 40% |
| 3. Final Exam | 40% |

Economics 722

Students registered in Economics 722 have an additional requirement, which is a replication project. Students will select a previously published paper based on a randomized control trial, and replicate the findings. Specific instructions are at LEARN.

KEY NOTES:

- All information on the Final Exam is TBA.
- Combination of particular distribution and absolute measures will be used to determine the course grades. The university grading system will be relied on as benchmark.

Tentative Schedule

Date Posted	Topic
Week 1	The Evaluation Problem/Credibility Revolution/Treatment effects
Week 2	Working with Experimental Data: A review of 2-group Hypothesis Testing
Week 3	Working with Non-experimental Data
Week 4	Working with Experimental, Longitudinal Data
Week 5	Matching Estimators
<i>Week of February 20th</i>	<i>Reading Break</i>
Week 6	Instrumental Variables and the Local Average Treatment Effect ('LATE')
Week 7	LATE with Experimental Data
Week 8	Difference-in-Differences
Week 9	Regression Discontinuity
Week 10	Contaminated Experiments and the Difference-in-differences estimator I
Week 11	Contaminated Experiments and the Difference-in-differences estimator II
Week 12	Exam

Policies

Assignment Policy

All assignments are submitted at LEARN. For the Major Data Assignment, late submissions incur a penalty of 2 points per day. Due dates for assignments are known well in advance. Mini-Assignments are due by 11:59pm on Saturday each week. Given that students have all week to complete the Mini-Assignments, late Mini-Assignments are not accepted under any circumstances.

Examination Policy

Missing the final exam is a very serious matter which automatically results in a grade of zero for the final exam and possibly a failing grade for the course. *Please carefully read the Economics Department policy on deferred final exams for instructions.* Please see the policy below on deferred exams in the Department of Economics.

Institutional-required statements for undergraduate course outlines approved by

Senate Undergraduate Council, April 14, 2009

Economics Department Deferred Final Exam Policy

Deferred Final Exam Policy found at <https://uwaterloo.ca/economics/undergraduate/resources-and-policies/deferred-final-exam-policy>

Academic Integrity

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the

course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to [Policy 71 - Student Discipline](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71) (https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-71)

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70 - Student Petitions and Grievances](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70) (https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-70), Section 4.

Appeals: A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read [Policy 72 - Student Appeals](https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72) (https://uwaterloo.ca/secretariat-general-counsel/policies-procedures-guidelines/policy-72).

Other sources of information for students:

[Academic Integrity website \(Arts\)](https://uwaterloo.ca/arts/current-undergraduates/student-support/ethical-behaviour)

https://uwaterloo.ca/arts/current-undergraduates/student-support/ethical-behaviour

[Academic Integrity Office \(UWaterloo\)](https://uwaterloo.ca/academic-integrity/) https://uwaterloo.ca/academic-integrity/

Accommodation for Students with Disabilities

Note for students with disabilities: The [AccessAbility Services](https://uwaterloo.ca/disability-services) office

(https://uwaterloo.ca/disability-services), located on the first floor of the Needles Hall extension (NH 1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic

term.