

**UNIVERSITY OF WATERLOO**  
**ECONOMICS 323: ECONOMETRIC ANALYSIS 2**  
**SPRING 2023**

---

**Instructor** Chris Riddell  
Hagey Hall 104  
Email: [c2riddell@uwaterloo.ca](mailto:c2riddell@uwaterloo.ca)

**Course Description**

This course covers the most important econometric methods beyond the use of the ordinary least squares (OLS) estimator with cross-sectional data. Particular attention is paid to econometric methods for estimating causal impacts. The course begins by reviewing sampling distributions of estimators and a simple regression model. The course then outlines a simple framework (potential outcomes model) for thinking about causality, and the challenge of solving selection bias with non-experimental data. Various methods for tackling selection bias are then presented including multivariate regression, panel data methods, instrumental variables, and regression discontinuity. The course also introduces students to the major data structures encountered in economics beyond cross-sectional data including panel (longitudinal) data and hierarchical/multi-level data. Students will receive regular assignments—and complete a major project—which require use of a statistical software package to apply the methods learned in class to real-world data.

**Textbook**

Jeffrey Wooldridge. *Introductory Econometrics: A Modern Approach (7<sup>th</sup> edition)*, South-Western Cengage Learning, 2019.

Note: earlier versions are acceptable

This course also uses my own customized readings for certain topics.

Recommended:

Josh Angrist and Jorn-Steffen Pischke. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton University Press, 2008.

Josh Angrist and Jorn-Steffen Pischke. *Mastering Metrics: The Path from Cause to Effect*. Princeton University Press, 2014.

## Office Hours

Monday and Wednesday 1pm to 2pm

## Assignments and Software (Assignments, In-class Exercises)

Students will be required to complete regular, short data assignments. All assignments are submitted @ LEARN using the Dropbox. See policies below for other important submission information. Assignments are graded out of 10 based on the following: i) a grade of 0 when an assignment is not submitted on time, ii) a grade of 5 when the assignment is completed on time, but does not meet expectations, and iii) a grade of 10 when a mini-assignment is submitted on time and meets expectations.

Most classes will also have questions to be completed in-class. These are submitted to the Dropbox @ LEARN and constitute the participation grade. While In-class exercises are designed to be done during class, they can be submitted up until 11pm on the day of the class. In-class exercises are purely participation and thus receive full marks as long as a reasonable attempt is made.

The assignments use statistical software. The course lectures and tutorials will use the software package Stata. Stata is available in the PAS computer lab, which can also be accessed remotely on your laptop. If a student wants their own copy of the Stata software for their personal computer, a 6-month educational subscription is available for University of Waterloo students for \$50 (see: <https://www.stata.com/order/new/edu/profplus/student-pricing/>). If you purchase your own copy, choose the “Stata/BE” version.

## Evaluation

Participation	15%
Assignments	25%
Exams	60%

There will be three in-class exams (no standard final exam). The best two scores will count for the final grade.

## Schedule

\*Please note that this schedule is *tentative*

	<b>Topic</b>	<b>Notes</b>
May 8-10	Course Outline / Review of a Sampling Distribution Model	
May 15-17	Confidence Intervals and the 2 Group Hypothesis Test	
May 22-23-24	From a Two-Group Hypothesis Test to Linear Regression ( <b>ONLINE CLASS May 23</b> )	May 22 is Victoria Day. Tuesday May 23 is a make-up, but our class will be online. May 24 is a standard class
May 29-31	May 29: Causal Inference and Selection Bias <b>Exam 1: May 31<sup>st</sup></b>	
June 5-7	Regression with Experimental Data; Multivariate Regression	
June 12-14	Multivariate Regression Continued	
June 19-21	Panel Data	
June 26-28	<b>Exam 2: June 26<sup>th</sup></b>	<b>June 28 is an ONLINE CLASS</b>
July 3-5	The Difference-in-Differences Estimator	July 3 is Canada Day
July 10-12	Instrumental Variables and the Local Average Treatment Effect ('LATE')	
July 17-19	LATE Continued	
July 24-26	Regression Discontinuity	
July 31	<b>Exam 3</b>	This is a make-up class from Canada Day

## Policies

### Late Assignment/Project Policies

All mini-assignments, including the Project, are submitted at LEARN. For mini-assignments, late submissions are not accepted under any circumstances. For the Major Project, late submissions incur a penalty of 2 points per day (the Major Project is graded out of 100). Students should count on a mini-assignment being due most weeks once the review material is complete. Mini-assignments are always due by 11:59pm on Sunday.

### 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>)

**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), 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.