

**University of Waterloo**  
**Department of Economics**  
**Economics 621: Econometrics I**  
**Fall 2019**

**Lecture Time/Location:** Tuesday and Thursday, 10:00pm - 11:20pm, RCH 205

**Instructor:** Tom Parker

**Office:** HH 206

**Office Hours:** Tuesday, 2pm - 3pm or by appointment

**Email/Phone:** (email preferred) [tmparker@uwaterloo.ca](mailto:tmparker@uwaterloo.ca) / x38600

### **Course Objective**

This course introduces you to estimation and inference for models that are commonly used in economics. After an introduction to the linear model and the least squares estimator, we will discuss ways to alter the basic methods to deal with challenging features typical of economic data, including heteroskedasticity, serial dependence and endogeneity. These skills should prepare you to use more advanced estimation and inference techniques in applied econometrics courses or in advanced econometric theory courses.

### **Textbook**

There are two texts:

1. The main text is *Econometric Theory and Methods* by R. Davidson and J.G. MacKinnon, Oxford University Press 2004.
2. For learning about how to get your work done using R, a freely available statistical software package, a recommended text is *Applied Econometrics with R* by C. Kleiber and A. Zeileis, Springer 2008. This book is available electronically from the university website [here](#).

### **Topics**

The exact timing will be determined as we go along, but the material will be sequenced as follows. Chapters of Davidson & MacKinnon that you should read are in parentheses.

1. **Mathematical preliminaries:** (1-2) A quick review of necessary probability theory, algebra and geometry required to work with the ordinary least squares estimator.
2. **Ordinary least squares:** (3-5) Statistical properties of LS estimates, inference methods.
3. **OLS Extensions:** (6-7) Nonlinear regression and generalized least squares.
4. **Instrumental variables and GMM:** (8-9) Estimation with endogenous explanatory variables, generalized method of moments.
5. **MLE and related models:** (10-11) Maximum likelihood estimation and related models.

### **Evaluation**

Your mark will be made up of the following parts, with relative weights in parentheses below. Homework may be completed in groups of up to three people. There will be approximately one homework assignment per itemized section listed above.

1. Homework (20%)
2. Midterm Exam (40%)
3. Final Exam (40%)

## Other administrative details:

### 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. See the [UWaterloo Academic Integrity](#) webpage and the Arts [Academic Integrity](#) webpage for more information.

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. For typical penalties check [Guidelines for the Assessment of Penalties](#).

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](#), Section 4. When in doubt, please be certain to contact the department’s administrative assistant who will provide further assistance.

Appeals: A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 - Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72 - Student Appeals](#).

### Accommodation for Students with Disabilities

Note for students with disabilities: [The AccessAbility Services office](#), located on the first floor of the Needles Hall extension (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.

### Mental Health Support

All of us need a support system. The faculty and staff in Arts encourage students to seek out mental health supports if they are needed.

#### On Campus

- Counselling Services: [counselling.services@uwaterloo.ca](mailto:counselling.services@uwaterloo.ca) / 519-888-4567 ext 32655
- [MATES](#): one-to-one peer support program offered by Federation of Students (FEDS) and Counselling Services
- Health Services Emergency service: located across the creek from Student Life Centre

#### Off campus, 24/7

- [Good2Talk](#): Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-433 ext. 6880
- [Here 24/7](#): Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- [OK2BME](#): set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online at the Faculty of ARTS [website](#) Download [UWaterloo and regional mental health resources \(PDF\)](#) Download the [WatSafe](#) app to your phone to quickly access mental health support information

### Territorial Acknowledgement

We acknowledge that we live and work on the traditional territory of the Attawandaron (Neutral), Anishinaabeg and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes ten kilometers on each side of the Grand River.