

**University of Waterloo
Department of Economics
Economics 322**

Course Outline

(Fall 2020)

Instructor: Dinghai Xu

Email: dhxu@uwaterloo.ca

Course Description

This course covers the core topics needed to estimate linear models using ordinary least squares and to interpret estimates for cross-sectional data. Students will learn to interpret the coefficients of linear models for continuous and discrete regressors, to conduct reliable inference for different specifications of the error term, and to determine which model is the most suitable among the class of linear models. It concludes with an introduction to the method of instrumental variables. Students will be introduced to a statistical software package and will be required to complete regular computer-based assignments throughout the course.

The course slides will be uploaded on Learn for each topic. Some video lectures may also be uploaded on Learn. I strongly encourage students to read the corresponding chapters in the textbook for better understanding the course materials.

Recommended References

Wooldridge, J. M., *Introductory Econometrics: A Modern Approach*, Sixth Edition, Cengage Learning.

Note: (1) Newer Editions are preferred, however, previous editions can also be used.
(2) Students are expected to read the corresponding chapters for each topic covered. The chapters are listed in the Topics section below.
(3) Another popular Textbook:

Stock, J and Watson, M., *Introduction to Econometrics*, Pearson.

Topics to be covered

Weeks 1—3:

Statistics Foundation [Appendices B and C]

Overview of important concepts in statistics.

Linear Simple Regression Models [Chp. 2]

OLS and its statistical properties.

Multiple Regression Models [Chp. 3]

Regression models with more than two regressors, Interpretation of coefficients, Model selection.

Weeks 4—6:

Inference [Chp. 4]

Hypothesis Testing of single and multiple linear restrictions

OLS Asymptotics [Chp. 5]

Discussion on the properties of OLS as the sample size increases

Weeks 7—9:

Functional forms and prediction [Chp. 6]

Model functional forms and prediction based on linear regression

Regression with qualitative information [Chp. 7]

Including dummy variables in a regression

Weeks 10—12:

Heteroscedasticity [Chp. 8]

Discussion on regression when the constant variance assumption is violated.

Model Specification and Data Problems [Chp. 9]

Model functional form, Measurement errors, Common Data Problems.

Introduction of Instrumental Variables [Chp. 15]

IV estimator, Two Stage Least Squares.

Computing SoftWare

There will be several questions in the problem sets which require using statistical software for computation. Feel free to use any computing package you prefer. But I would suggest Stata or Matlab or R.

Office Hours

I will hold a weekly “office hour” (Friday 14:00 – 15:00) in an email format. I will be on line to respond your questions during the time. Please feel free to communicate with me via email during the office hours. Of course, you could also feel free to ask questions any other time via email. But, there might be a bit delay in responding outside the office hour time. (Please use your UWaterloo email account. And please specify “Econ 322+Student Name+ ID” in your email subject.)

Course Requirements

- Homework (30%)
- Computer Exercises (30%)
- Empirical Data Project (40%)

Important Notes:

- (1) I will use Learn to communicate with you. So all the class announcements, assignments, computer exercises, and all other course related materials will be posted on Learn. Please make sure checking Learn regularly.
- (2) For almost every chapter, there will be an assignment and a computer exercise.
- (3) You need to submit your assignments and computer exercises via Learn Dropbox.
- (4) The due day for the Empirical Data Project is Dec. 11, 2020 (23:59:59). I will provide you more details on this empirical data project later.
- (5) The penalty for late submission (for assignment, computer exercise and empirical data project) is 50% per day. Therefore, your submission will NOT be accepted two days after the due day.

[Economics Department Deferred Final Exam Policy](#)

Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

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.

If you are using Turnitin® in your course

Turnitin.com: Text matching software (Turnitin®) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. Students will be given an option if they do not want to have their assignment screened by Turnitin®. In the first week of the term, details will be provided about arrangements and alternatives for the use of Turnitin® in this course.

Note: students must be given a reasonable option if they do not want to have their assignment screened by Turnitin®. See [guidelines for instructors](#) for more information.