

ECO220Y1: Introduction to Data Analysis and Applied Econometrics

Summer 2022

Instructor: Xiner Xu	Lecture: MW 6-8pm
Section: LEC5101	Tutorial: Th 6-8pm
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Quercus: https://q.utoronto.ca/courses/263393	
Piazza: https://piazza.com/utoronto.ca/summer2022/eco220/home	

1 Description

ECO220Y Introduction to Data Analysis and Applied Econometrics is an intermediate level course in quantitative methods for students at the University of Toronto St. George campus. This course is designed to equip you with essential tools to describe, summarize and analyze data.

Our course is coordinated across three lecture sections. This syllabus and the course Quercus and the course Piazza sites are for Section LEC5101 only. However, all three sections write a common final exam. We also share similar content for tutorials and group projects, where you dive into real data and research, and replicate key findings.

2 Prerequisites

The Economics Department strictly enforces its prerequisites policy. An administrator will remove anyone missing [prerequisites](#). I cannot waive prerequisites.

3 Learning Objectives

- Translate between plain English and statistical terms and concepts: identify key information regardless of wording and distinguish incorrect statements from correct ones.
- Select and apply a suitable quantitative approach to a new situation while making your reasoning clear: may require sentences, precise statements of hypotheses, equations, calculations, fully-labeled graphs, diagrams.
- Proficiently read output from various statistical software packages including `stata`.
- Use Excel to analyze data and replicate published results.
- Correctly interpret quantitative results for a non-technical or technical audience.
- Draw valid statistical conclusions and steer clear of common pitfalls.
- Explain what would change if a researcher made different choices or the data changed.
- Identify the underlying assumptions in quantitative analyses and figure out how violations affect conclusions and interpretations.
- Read and critically evaluate analyses without being dazzled by data, methods or jargon.
- Effectively apply course concepts to a wide range of contexts from popular press articles to papers in peer-reviewed academic journals.
- Assess available data or propose a data collection plan to address a research question.
- Craft concise, clear, and coherent written arguments that directly answer asked questions.

4 Readings

4.1 Required Textbook

Business Statistics (2020), Fourth Canadian Edition by Sharpe, DeVeaux, Velleman, and Wright. MyLab Statistics, which comes with this first option, is NOT required. You may purchase one of the options below

- Bound hardcover textbook that also includes an access code for the eText and MyLab Statistics from the U of T Bookstore for \$189.99 (ISBN 9780135582084)
- eText directly from Pearson for \$49.99 (ISBN 9780136964032)
- Unbound loose-leaf print version directly from Pearson for \$65.00 (ISBN 9780135469019)

4.2 Required Readings

Our course includes significant readings from the required textbook as well as important supplements that are available to you at no charge on Quercus. The schedule page on Quercus gives the reading assignment for each week. Complete readings *before* attending lectures.

The required readings are listed below. The supplements created for our course are marked in boldface below and the chapter numbers reference our required textbook.

- **Prerequisite Review for ECO220Y1Y, 2021/22 pages 1 - 43**
- Chapter 1: An Introduction to Statistics
- Chapter 2: Data
- Chapter 3: Surveys and Sampling
- Chapter 4: Displaying and Describing Categorical Data
- Chapter 5: Displaying and Describing Quantitative Data
- Chapter 6: Scatterplots, Association, and Correlation
- **SW11: Chapter 1, Economic Questions and Data pp. 1 - 13 from Introduction to Econometrics, Third Ed., 2011, by James H. Stock and Mark W. Watson**
- Chapter 7: Introduction to Linear Regression
- **Logarithms in Regression Analysis with Asiaphoria for ECO220Y1Y, 2021/22 pages 1 - 28**
- Chapter 8: Randomness and Probability
- Chapter 9: Random Variables and Probability Distributions (Excluding Sections 9.7 The Poisson Distribution, 9.12 The Exponential Distribution, and “Normal Probability Plots” pp. 280-2)
- **Normal Table: Read it, Use it for ECO220Y1Y, 2021/22 pages 1 - 7**
- Chapter 10: Sampling Distributions
- Chapter 11: Confidence Intervals for Proportions
- Chapter 12: Testing Hypotheses About Proportions
- Chapter 13: Confidence Intervals and Hypothesis Tests for Means
- Chapter 14: Comparing Two Means
- Chapter 18: Inference for Regression (Excluding “How does the Normal probability plot work?” pp. 607-8)
- Chapter 19: Understanding Regression Residuals
- Chapter 20: Multiple Regression
- Chapter 21: Building Multiple Regression Models emphasizing Sections 21.1 Indicator (or Dummy) Variables, 21.2 Adjusting for Different Slopes – Interaction Terms, and Quadratics (online) (Excluding “Residuals and Standardized Residuals” and “Influence Measures” pp. 737-9)

5 Course Structure

5.1 Lectures

Mandatory lectures will be in person unless university guidelines advise otherwise. You must attend lecture with your ACORN section at your assigned time: we cannot permit you to switch times for any reason.

Lecture slides will be posted on the course Quercus page ahead of time. They are to facilitate note taking during lecture and by no means a replacement for attending lecture. Test material will *heavily* gravitate towards content only available at the time of lecture. Students who miss classes, for legitimate reasons or otherwise, are responsible for making up the missed material. Be sure to complete the readings before lecture and come to class prepared with a printed copy of the slides and ready to take notes.

5.2 Tutorials

Tutorials will cover similar material to the lectures but focus on problem solving and practical application using statistical software. Make sure you keep up to date with posted lecture content and readings.

A TA will first guide you through problems set using the same concepts and skills that learned in the lectures. Note that, step-by-step solutions will *not* be posted on Quercus. The second half of the tutorial is dedicated to hands-on training in **R**, a popular open-source programming language. The skills you develop during the tutorials are necessary to complete the group projects. Your participation grade will be assigned based on completion of in-class assignments. See Section 7.2 for details.

5.3 Ungraded Homeworks

Problem sets accompanying the lectures are available on Quercus. You can access them either through the course calendar or find them under the homework folder under **Files**. These include assigned end-of-chapter text-book exercises and problems that supplement the textbook. You are expected to complete them and check the solutions after each lecture.

6 Resources

6.1 Piazza

Your questions about the course material are often of interest to other students. You are strongly encouraged to post questions on Piazza, a platform that allows for student-to-student Q&A. A TA will regularly monitor the forum to help students with unanswered questions. To make the most out of this tool, please carefully follow the Piazza guidelines.

6.2 Office Hours

We offer both in-person and virtual Office Hours throughout the semester. This is a chance to talk about the course curriculum, study approaches, and other matters with the instructor and the TAs. There will be additional office hours when demand is high, such as ahead of a term test. The up to date schedule and Zoom link can be found on the course Querus page.

6.3 Communication Policy

Requests for re-marking should be submitted through relevant forms (see Section 7.4.1). And most questions can be answered at office hours or on Piazza, leaving limited circumstances where emailing questions is necessary.

When emailing is necessary, *always include “ECO220” in the subject line*. Failure to do so might delay response. Your signature should include your student number, and both the name you are usually addressed by, and your ACORN name if it is different. I may not repeat information that can be found on the syllabus or on Quercus, nor answer questions about the course material.

7 Evaluation

Assessment	Due Date	Time	Weight
Syllabus Quiz 1	Friday, May 27	11:59 p.m.	0.5%
Syllabus Quiz 2	Friday, June 17	11:59 p.m.	0.5%
Syllabus Quiz 3	Friday, July 22	11:59 p.m.	0.5%
Syllabus Quiz 4	Friday, August 12	11:59 p.m.	0.5%
Participation	Day of the Tutorial	11:59 p.m.	9%
Group Project 1	Friday, June 17	11:59 p.m.	7.5%
Group Project 2	Friday, August 5	11:59 p.m.	7.5%
Term Test 1	Monday, May 30	6-8 p.m.	13%
Term Test 2	<i>TBD by A&S</i>	6-8 p.m.	13%
Term Test 3	Monday, July 25	6-8 p.m.	13%
Open Make-up	Thursday, August 11	6-8 p.m.	<i>replaces the lowest Term Test</i>
Final Exam	<i>TBD by A&S</i>	TBD	35%

7.1 Syllabus Quiz

Our section partners with a research team to study students’ learning habits and beliefs about their academic performance. There will be four surveys, approved by the Research Ethics Board, throughout the semester. Each complete survey is awarded 0.5% of the course mark. Personally identifiable information will only be held until the course concludes in

order to assign marks. Your responses to the surveys will remain anonymous and are **not** part of the evaluation of your course performance, in any shape or form. No identifying information will be used in the study itself.

7.2 Participation in Tutorials

Assignments must be uploaded to Quercus before 11:59 p.m. the same night. No late submissions for tutorials will be allowed. The lowest tutorial grade will be dropped. You may not earn credit for a submission that shows a lack of effort. Remember, ***plagiarizing someone else's code is an academic offense.***

7.3 Group Projects

There will be two data projects where students will be motivated by an interesting article or question to perform basic operations on existing data, generating and then interpreting their findings.

Students should form groups of ***no more than 4 people by June 3.*** You will collaborate with the same teammates on both projects. All individuals in a group will receive the same grade.

7.3.1 Late Submissions

There is a late penalty of 10% per day (including weekends) of the total marks for the assignment, *e.g.* Group Project 1 submitted ***any time*** on June 18 will be subject to a 10% penalty even if it is just past the midnight, and a 20% penalty if submitted any time on June 19.

Projects submitted five calendar days beyond the due date will be assigned a grade of zero. Accommodations due to late registration into the course will **not** be approved. Extensions will only be considered for the project under extenuating circumstances as students have the option to complete these in groups and over the entire length of the term. I would suggest you manage the time and complete the project well in advance of the deadline to avoid any issues impacting you nearer the deadline.

7.4 Term Tests and Final Exams

The information for each term test and the final exam will be announced on Quercus in advance. The aid sheets – formulas and statistical tables – for the entire course are on Quercus. Students will be given a hard copy during tests and exams. The final exam is cumulative. Topics addressed in lectures, tutorials, homework and required readings are testable.

7.4.1 Re-mark Requests

For a re-mark request you must:

1. Submit a Re-mark Term Test MS form, links to these forms are available on Quercus;
2. Explain why more points are justified;
3. Submit the request within *two weeks* of the work's return to the class.

The instructor reserves the right to review in its entirety instead of just the parts in question. Your mark may remain unchanged, go up, or go down. Continuing with the the appeal means the student accepts this condition. Requests are reviewed after the two-week deadline, not immediately. Requests submitted after the deadline will not be considered.

Neither will we consider individual re-mark requests for machine-graded questions. If there is an error in a question or answer, all submissions will be regraded and, or some other general adjustment made. For numeric questions, often people are upset when they are close, but outside the margin of error. You cannot request partial credit or a re-marking in such a case. Requirements are set with care and with sound pedagogical reasons.

7.5 Missed Assessments

Any missed work earns a mark of zero. This section explains special accommodations for: illness, injury, personal/family problems, joining our course late, religious reasons, extracurricular conflicts, quarantine issues, travel issues, accessibility concerns, and/or other challenging situations. In contrast, vacations, pre-purchased plane tickets, family plans, your friend's wedding, lack of preparation, or too many other tests/assignments are not acceptable excuses for missing a quiz, a test, or an extension. Remember, for significant challenges, which last more than a week, *work with your College Registrar immediately*.

An open make-up test taking place on Thursday, August 11 accommodates students that cannot write one term test and also those who write a test in difficult circumstances and do poorly. You do not need to provide medical documentation or reasons for missing one term test. You are allowed one missed tutorial without penalty.

Accommodations for missing more than one test or tutorial are extremely limited: (1) a College Registrar writes to me after working extensively with a student and formally requests an accommodation on the student's behalf or (2) more than one conflict not related to injury, illness or personal/family problems where I am contacted by the student very far in advance (e.g. an athlete who notifies me in May of conflicts with international competitions). In these limited situations, I will consider whether accommodations can still meet all course requirements or whether the student must be advised to drop the course and retake it when able to complete the required work. Any such extraordinary accommodations are at my discretion and may involve completing work at an alternate time, an oral and/or other assessment, re-weighting, and/or may be contingent on performance on other work.

If you are going to miss the *final exam*, follow the instructions (<https://www.artsci.utoronto.ca/current/faculty-registrar/petitions/deferred-exams>) to submit a deferred exam petition instead. Instructors and departments cannot excuse a student from writing a final exam, nor can they offer an alternative date or form of examination.

8 Recording, Photographing and Publishing Course Material

Lectures and course materials prepared by the instructor are considered by the University to be an instructor's intellectual property covered by the Canadian Copyright Act. Per [university policy](#), students wishing to record lecture or other course material in any way are required to ask the instructor's explicit permission, and may not do so unless permission is granted. This includes tape recording, filming, photographing PowerPoint slides, Quercus materials, etc. Such permission is only for that individual student's own study purposes and does not include permission to "publish" them in any way. It is absolutely forbidden for a student to publish an instructor's notes to a website or sell them in other form without formal permission.

In the case of private use by students with disabilities, the instructor's consent will not be unreasonably withheld. Students with disabilities who request accommodation should contact [Accessibility Services](#) on their campus.

9 Academic Integrity

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's [Code of Behaviour on Academic Matters](#) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources.

10 Accessibility

U of T is committed to the full participation of students with disabilities in all aspects of campus life. The Accessibility Resource Centre provides academic accommodations and services to students who have a physical, sensory, or learning disability, mental health condition, acquired brain injury, or chronic health condition, be it visible or hidden. Students who have temporary disabilities (e.g., broken dominant arm) are also eligible to receive services. All interested students must have an intake interview with an advisor to discuss their individual needs. Students who require accommodation are advised to visit the both the [Accessibility Services](#) and [Accommodated Testing Services \(ATS\)](#) as early as possible, as it may take some time to process the application.