

Department of Economics
University of Toronto
ECO220Y - L0101
Quantitative Methods
Fall-Winter 2015/2016

Lectures: Thursday 12-2pm (Location: SS2135)

Tutorials: Friday 9-11am (Location: BR200 (Fall), SS2135 (Winter))

Note that on occasions we may use two hours on Friday for makeup classes or tests

Instructor: Jessie Lamontagne

Contact: jessie.lamontagne@utoronto.ca, Room GE277, Max Gluskin House, 150 St. George St.

Office Hours: Wednesday 10-11am and/or by appointment.

Teaching Assistants: Valerie Xiao Yue Zhang, Andrew James Mollard, Michael Bojan

TA office hours will be posted on Blackboard

Piazza: <https://piazza.com/utoronto.ca/fall2015/eco220y1/home>, see Section 7

Economics Study Centre (GE 110): MTWR 11:00 - 7:00, F 11-3, 150 St George St., main floor

1 Course Description:

Undergraduate training in economics is intended to familiarize students with the discipline of economic thinking, to equip them to better understand human behaviour, and for the intelligent appraisal of contemporary economic problems. The application of economic theory to real world problem requires the use of statistics. As part of the economics curriculum, this course will focus on numerical and graphical data description techniques, data collection and sampling, probability, sampling distributions, statistical inference, hypothesis testing and estimation, simple and multiple regression analysis. By the end of the course, you should be familiar with study methods, the basis for these methods, when each is or is not appropriate, and how to correctly interpret and explain results. As a result, you should also be able to form an informed opinion of news report that make use of statistics.

2 Prerequisites:

An administrator will remove anyone missing prerequisites: ECO100Y1(67%)/ ECO105Y1(80%); MAT133Y1/(MAT123H1, MAT124H1)/(MAT135H1, MAT136H1)/MAT137Y1/MAT157Y1. See: <http://www.economics.utoronto.ca/index.php/index/undergraduate/load/prerequisites>.

Please note that some specialist programs require you to obtain at least 70% in this course in order to enrol in upper-year courses. If you intend to take courses which require 70% in ECO220, you should work hard towards that goal throughout the year and seek help early if you are struggling to meet this requirement. I will not, under any circumstances, make changes to your grades in order to allow you enrolment in upper-year courses.

3 Required reading:

The textbook is a custom book *Business Statistics, Third Custom Canadian Edition for ECO220Y, Published 2013* by Sharpe, De Veaux, Velleman, and Wright (ISBN 9781269514163). (It is a proper subset of ISBN 9780321781833.) The [U of T Bookstore](#) and [Discount Textbooks](#) have copies. Used copies from 2013/14, Summer 2014, 2014/15 and Summer 2015 may be available. Editions published before 2013 are not recommended. The course reserves at Robart's Library and the Economics Study Centre have the required text. ***Consider our textbook authors as co-instructors.*** In addition to the textbook, you will be required to read a number of articles and handouts (posted on Blackboard). A detailed schedule of readings will be posted each week.

4 Learning Objectives

- (1) Translate between plain English and statistical terms and concepts: identify key information regardless of wording, discriminate among statements that sound superficially similar but are fundamentally different, and distinguish incorrect statements from correct ones
- (2) Select a suitable quantitative approach to a “new” situation and apply it
- (3) Proficiently read output from various statistical software packages including STATA
- (4) Use Excel to conduct statistical analyses
- (5) Correctly interpret quantitative results for a non-technical or technical audience
- (6) Draw valid statistical conclusions and steer clear of common pitfalls
- (7) Explain what would change if a researcher made different choices or the data changed
- (8) Identify the underlying assumptions in quantitative analyses and figure out how violations affect conclusions and interpretations
- (9) Critically evaluate analyses without being dazzled by numbers, data and jargon
- (10) Effectively apply course concepts to a wide range of contexts from popular press articles to papers in peer-reviewed academic journals
- (11) Assess available data or propose a data collection plan to address a research question
- (12) Craft concise, clear, and coherent written arguments

4.1 “What do I have to know for the tests?” “How to prepare?”

The learning objectives indicate how to show that you understand the material at the required depth. Construct *full* replies for homework and old tests/exams in test-like conditions. If you cannot solve a question after a sustained effort, turn to your notes, book, and homeworks. As a last resort, turn to a person or the solutions. Browsing solutions (including peeking) undermines your study and robs you of practice for the test/exam. Use solutions to check your answers.

Topics addressed in lectures, required readings OR homework are testable. If a concept appears in multiple venues then that signals high importance. Test questions are inspired by our current course materials (homeworks, lectures, textbook, handouts, etc.). You may hone your test-taking skills and assess the required depth of understanding by working with old tests. Since I am a relatively new instructor, I will assign questions from other instructors' past tests and exams that you may use for practice; that said, you should expect my own twist on the material, which you can see from my homework questions and class examples.

5 Term work and evaluation

* For tests and the final exam you must bring your TCard and you may bring a non-programmable calculator. Tests #1 and #4 are planned to be multiple-choice questions (“MCQ”); the other tests are planned to be open-ended questions. The “One Question” test requires a longer written answer (scrap paper for a first draft/outline given). For tests and the final exam you will be given aid sheets: formulas and relevant statistical tables. Aid sheets are posted at least a week before so that you may familiarize yourself with them. All sections of ECO220Y1Y write the same cumulative final exam.

Assessment	% of Grade	Length	Dates, Time
Writing assignment: “Understanding data”	8%		Oct. 23, 11:59 pm
Test #1: “MCQ practice test”	3 %	50 min.	Oct. 30, 9:10-10 am
Test #2: “MCQ”	7 %	110 min.	Dec. 4, 9:10-11 am
Test #3: “Midterm”	20 %	110 min.	Feb. 5, 9:10-11 am
Test #4: “One Question”	12 %	110 min.	March 11, 9:10-11 am
Test #5: “MCQ”	10 %	110 min.	Apr. 8, 9:10-11 am
in-class writing (Fall)	2.5 %	–	Sept. 17 – Dec. 3, in classes
in-class writing (Winter)	2.5 %	–	Jan. 14 – Apr. 7, in classes
Excel Test	10 %	60 min.	TBA Mar./Apr.
Final Exam	25 %	3 hrs.	Apr. 12 - 29, TBA by A&S

Why is there so much term work? ECO220Y is extremely cumulative: each new concept requires a deep understanding of previous ones. Statistics is learned by doing it and receiving feedback. Weekly homework and the graded assessments ask you to *do* statistics.

5.1 Writing in ECO220

Quantitative methods are an integral part of learning economics and you need to be able to discuss applications of this course in your own words. There is no career following an economics or business degree in which you will not be required to regularly write, and you need to be able to write clearly and concisely in plain English. In order to help you towards this goal, you will be provided with writing instructions in class and in tutorials, and your writing will be evaluated on a regular basis

*If you have *serious* concerns about this marking scheme, see me in office hours *before* Sept. 26 to discuss possible *modest and limited* reallocations in light of special circumstances.

so that you can track your progress.

The writing assignment in the fall will require you formulate a research question, and find a data source that will allow you to answer the question using tables and/or graphs. You will then write a short (1-2 pages) paper explaining the source of the data as well as the significance of the data output you created. You will be provided with more detailed instructions at each stage of the assignment, and there will be a special tutorial to help you learn necessary skills to completing the assignment.

The in-class writing assignments will test your understanding of the material as you learn it, and count as participation marks. These assignments will not be graded individually, but we will discuss answers in class. In order to get the full mark, you need to hand in 80% of the assignments, which will occur at random intervals (not necessarily every week). These assignments are designed to help prepare you for long answer questions on the midterm and final.

The One Question test will further help you prepare for the final, and is designed to help you get a deeper understanding of the material we will cover in the second half, especially regression analysis. Building on the material covered in class, you will be asked to read an article, discuss the methodology, and interpret and explain the results. You will receive detailed instructions two weeks before the test, and there will be a special tutorial to help you prepare for the format.

5.2 Missed Tests

You are expected to complete all work as scheduled in Section 5. In exceptional circumstances you may request a make-up test. For ongoing issues (anything lasting more than a few days) you are expected to contact your College Registrar *immediately* in addition to taking the three steps listed below. Make-up tests are cumulative and will be scheduled at a time and date chosen by the instructor with as little as one business day's notice via e-mail. To request a make-up test you must complete ALL of these steps. (Please note that I do NOT wish to see a medical note.)

First Step: Send an e-mail to Prof. Lamontagne meeting ALL of these specifications.

- (1) Your e-mail is sent BEFORE the start of the missed test.[†]
- (2) It is sent from your U of T e-mail account (and not gmail, yahoo, etc.).
- (3) The subject line is “missed test.”
- (4) The e-mail is in PLAIN TEXT format and has NO ATTACHMENTS.[‡]
- (5) It concisely explains why you missed the test.
- (6) It lists all of your current courses and professors.
- (7) It identifies ALL of your efforts in other courses for the three days up to and including the missed test in our course (or it explains that you did nothing).
- (8) The last sentence is: “I understand that it is a punishable academic offense to present false or misleading information with my request for a make-up test.”
- (9) The e-mail closes with your name and STUDENT NUMBER.

[†]Five percentage points will be deducted from your make-up test mark for each hour or part of an hour that your e-mail is late. It is unacceptable to fail to show up for an important engagement without any advance notice.

[‡]The e-mail is the required documentation. I have found documents completed by medical professionals unhelpful: they focus on serving their patients, not defending academic integrity at U of T.

- (10) It is less than 250 words. Its tone and content are appropriate for an academic setting. Everything except the last sentence uses your own words.

Second Step: Check your e-mail. Within two business days after the missed test you will receive an e-mail: it will notify you of when and where to take the make-up test.

Third Step: Write the make-up test. A missed make-up automatically earns a mark of zero.

6 Excel Course Module

Instructor Chen (christy.chen@utoronto.ca) gives the required Excel Course Module (ECM) that complements our course. You will sign up for weekly Excel tutorial sessions held in a computer lab from January through March. (These are separate from regular TA tutorials.) These help you prepare for the Excel Test in late March that you take in a computer lab. Instructor Chen prepares the Excel Test and supervises its marking. The ECM uses the portal. In January you will be notified about how to sign up for an Excel tutorial section via the portal: a wide range of times and days will be available on a first-come, first-served basis.

7 Communication:

7.1 Website:

I will be using Portal/Blackboard to post slides, announcements, homeworks, and other useful information. We will also use the discussion board on Piazza (see below).

7.2 Email:

Feel free to email me with any question or concern you may have. I will do my best to get back to you within 48 hours. Please make sure to send the email from your University of Toronto email account. For questions related to the material covered in tutorials, please see a TA during office hours. If your question requires a long answer, I may ask you to come see me during office hour instead. If many students ask me the same question, I will respond with an announcement on Blackboard.

7.3 Piazza

Please take advantage of Piazza to ask questions and discuss the material amongst your peers. The teaching assistants and I will regularly check the discussion board and answer any open questions. Consider Piazza an integral part of your learning experience: by answering other students' questions, you get to deepen your own understanding of the material. If you are uncomfortable speaking up in class, you can use it to ask questions anonymously.

8 Tutorials:

There will be tutorials to cover selected questions from the homeworks, and to help prepare you for tests. Please note that solutions to the problem set questions **will** be posted, but the tutorials

will go beyond the material from homeworks and provide you with supplementary examples of the types of questions I may ask on tests. If you miss a tutorial, it is your responsibility to obtain the notes from one of your classmates.

9 Accessibility:

The University of Toronto provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. Students who require accommodations for a disability, or have any accessibility concerns about the course should feel free to approach me and/or the Accessibility Services Office (www.accessibility.utoronto.ca) as soon as possible.

10 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 (www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offenses. All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters.

11 The Economics Study Centre

The Economics Study Centre supports ECO220Y. Peer mentors are undergraduates who have done very well in their ECO courses. For in-depth questions, use our course TAs. <http://www.economics.utoronto.ca/index.php/index/undergraduate/load/studyCentre>

12 Topics and Required Readings

The course covers the following chapters in the textbook. Within each chapter all sections are required with exceptions noted below. We typically finish the first eleven chapters and part of Chapter 12 in the Fall term and the remaining chapters in the Winter term.

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"

Chapter 7: "Introduction to Linear Regression"

Chapter 8: "Randomness and Probability"

Chapter 9: "Random Variables and Probability Distributions" (Excluding Sections 9.7 "The Poisson Distribution" and 9.12 "The Exponential Distribution")

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”
Chapter 19: “Understanding Regression Residuals”
Chapter 20: “Multiple Regression” (Excluding Section 20.7 “The Logistic Multiple Regression Model”)
Chapter 21: “Building Multiple Regression Models” with *emphasis* on Sections 21.1 “Indicator (or Dummy) Variables”, 21.2 “Adjusting for Different Slopes – Interaction Terms,” and 21.6 “Quadratics”

Required readings (aside from the textbook) include: Chapter 1, “Economic Questions and Data,” from *Introduction to Econometrics, Third Ed.*, 2011, by James H. Stock and Mark W. Watson (SW11); “Belief in the Law of Small Numbers” by Amos Tversky and Daniel Kahneman published in 1971 in *Psychological Bulletin* (TK71)[§]; “The Standard Normal Table: Read it, Use it”; and “Logarithms in Regression Analysis.” These required readings (and any additional ones) will be given to you in either electronic or hardcopy format.

13 Laptops and Tablets in Class

You are free to bring a laptop or tablet to class if you do not distract people sitting near you by looking at content other than our course material. You may want to read “The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking” in *Psychological Science* by Mueller and Oppenheimer (from Princeton and UCLA) published May 2014.

Abstract Taking notes on laptops rather than in longhand is increasingly common. Many researchers have suggested that laptop note taking is less effective than longhand note taking for learning. Prior studies have primarily focused on students’ capacity for multitasking and distraction when using laptops. The present research suggests that even when laptops are used solely to take notes, they may still be impairing learning because their use results in shallower processing. In three studies, we found that students who took notes on laptops performed worse on conceptual questions than students who took notes longhand. We show that whereas taking more notes can be beneficial, laptop note takers’ tendency to transcribe lectures verbatim rather than processing information and reframing it in their own words is detrimental to learning.

The lecture slides posted on our course site before each class are formatted to facilitate adding meaningful notes by hand. I recommend printing the slides and adding your own notes during the lecture. The required readings, slides, and lectures are intended to be complimentary, not replace each other.

[§]This is an academic journal article co-authored by a winner of the Nobel prize in economics.