

# ECO220Y: Quantitative Methods in Economics, 2014/15

Prof. Murdock, Economics Department, University of Toronto

**Sections:** days, meeting times, rooms; You may attend any of these four sections

**L0101:** T 10-12, LM159; F 9-11: 9-10, SS2102

**L0201:** T 2-4, MP103; F 9-11: 10-11, SS2102

**L0301:** W 10-12, SS2117 (Fall), SS2118 (Winter); F 9-11: 9-10, MP202 (Fall), SS2135 (Winter)

**L0401:** W 2-4, SS2102; F 9-11: 10-11, MP202 (Fall), SS2135 (Winter)

**Office hours (GE 312):** W 12:45 - 1:45, W 4:30 - 5:30 (Fall); M 2 - 4 (Winter)

**Telephone, e-mail:** 416-946-0656, see Section 8

**Course site:** <http://homes.chass.utoronto.ca/~murdockj/eco220/> & portal

**Piazza:** <https://piazza.com/utoronto.ca/fall2014/eco220y1y>, see Section 8

**TAs:** Remi, Chris, Hammad, Thomas, Harris, Congfei, Jing, Vanessa, Gemma, Lei, Mathieu

**Economics Study Centre (GE 110):** MTWR 11:00 - 5:00, 150 St George St., main floor

## 1 Textbook & iClicker

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 and Summer 2014 may be available. The course reserves at Robart's Library and the Economics Study Centre have the required text. Older editions are not recommended. **Consider our textbook authors as co-instructors.** To register for MyStatLab (not required) go to [www.mystatlab.com](http://www.mystatlab.com) and use course ID instructo97855. **Using an iClicker remote is required:** new and used ones are available (e.g. U of T Bookstore, amazon.ca). You may borrow an iClicker or share an iClicker with anyone that is **not** currently taking ECO220Y with Prof. Murdock. You must use an iClicker *remote*: iClicker GO is not permitted. If you are unable to obtain an iClicker remote you may register for a short-term loan service.<sup>1</sup>

## 2 Weekly Lectures and Fridays

Tuesday and Wednesday meetings use PowerPoint and require your participation (iClicker). You may print the lecture slides (black and white is fine) ahead of class. **Take notes: slides are not notes.** You may attend L0101, L0201, L0301 or L0401 regardless of your ROSI registration.<sup>2</sup>

Fridays are reserved for tests, special sessions,<sup>3</sup> and TA tutorials. I give the TAs weekly lesson plans that focus on important topics. You are free to go to any tutorial section. Because tests fall on Fridays, there will be no regular TA tutorials those weeks. However, there are special TA review sessions and TA aid centres the weeks of tests.

<sup>1</sup>This is a short-term loan service: you must return the remote after each class. Visit the Economics Department Reception Desk (150 St George St) weekdays between 9:00 and 5:00 for more information.

<sup>2</sup>Because of the Fall Break, L0101 and L0201 are one lecture behind L0301 and L0401 for the last two weeks of the Fall term. Aside from those two weeks, all sections cover the same material each week.

<sup>3</sup>One is scheduled for Friday, February 6, 2015.

### 3 Required Readings & Homework

Weekly reading assignments and homework are on the course site. *Complete readings before class. The textbook highlights important points with boxes, which are sometimes in the margins. Pay particular attention to ALL of the boxes (e.g. “Just Checking”).* Chapter openers and closers such as “What Can Go Wrong?” and “Ethics in Action” are always part of the required reading. Complete homework soon after the related lecture.

### 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.

### 5 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>.

## 6 Marking Scheme and Assessments

For tests and the final exam you must bring your TCard and you may bring a non-programmable calculator. Tests #2 and #5 are planned to be multiple-choice questions (“MCQ”); the other tests are planned to be open-ended questions. The “One Question” tests require a longer written answer (scrap paper for a first draft/outline given) and you may have extra reading before each. The final exam is typically a mix of question formats. At Tests #2, #3, and #5 and the final exam you will be given aid sheets: formulas and relevant statistical tables. Because the “One Question” tests ask you to interpret (not calculate) quantitative results, no aid sheets are given. Aid sheets are posted at least a week before so that you may familiarize yourself with them. All five sections of ECO220Y1Y write the same cumulative final exam.

Assessment	% of Grade	Length	Dates, Time
Test #1: “One Question”	10 %*	110 min.	Friday, Oct. 24, 9:10 - 11 am
Test #2: “MCQ”	10 %*	90 min.	Friday, Nov. 28, 9:30 - 11 am
Test #3: “Midterm”	20 %	110 min.	Friday, Jan. 30, 9:10 - 11 am
Test #4: “One Question”	10 %*	110 min.	Friday, Feb. 27, 9:10 - 11 am
Test #5: “MCQ”	10 %*	90 min.	Friday, Mar. 27, 9:30 - 11 am
* Tests #1, #2, #4, and #5 together are worth 35 %, not 40 %. Whichever one ends up being your lowest mark will count for 5 % rather than 10 %.			
iClicker (Fall)	5 %	–	Sept. 16 – Dec. 2, in classes
iClicker (Winter)	5 %	–	Jan. 6 – Apr. 1, in classes
Excel Test	5 %	50 min.	TBA in late Mar
Final Exam	30 %	3 hrs.	Apr. 8 - 30, 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.

### 6.1 iClicker Class Participation

iClicker questions encourage you to prepare for class, talk about statistics, and identify misunderstandings. Complete readings before class. Like any class participation, quality matters. Correct iClicker responses earn full marks. Incorrect answers earn partial marks. Each unanswered question earns 0. Point values can vary by question. **You may attend L0101, L0201, L0301 or L0401: your iClicker will work.**<sup>4</sup> It is your responsibility to: correctly register your iClicker, bring it to class, arrive on time, and stay for the entire class.

To register go to <http://www1.iclicker.com/register-your-remote/register-clicker/>. You MUST use your **UTORid** – NOT your student # – as your “Student ID” and register by Lecture 3. **If you correctly register your iClicker by Lecture 3 AND attend Lecture 3 then a BONUS of 3 percentage points will be added to your iClicker (Fall) mark.**

A green light illuminates on your iClicker remote when your response is successfully recorded; a

<sup>4</sup>If you attend the same lecture more than once, only the first counts towards your mark.

red light or no light indicates a problem. If you forget your iClicker, I usually bring a backup.<sup>5</sup> Nearly all malfunctions and strange remote behavior can be fixed by replacing ALL batteries with new ones. For support call 866-209-5698 or visit <http://support.iclicker.com/>.

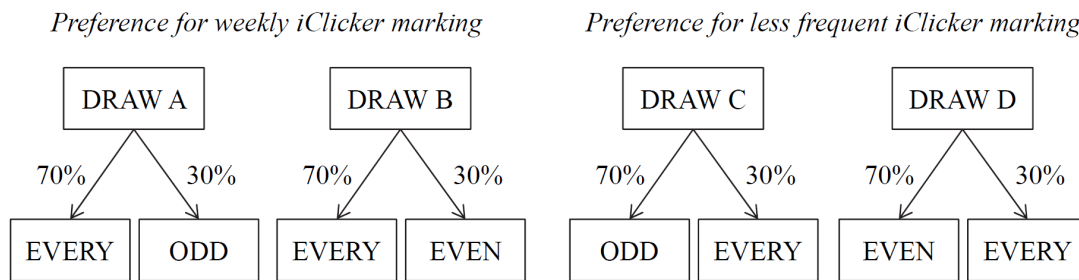
### 6.1.1 Academic Integrity and iClicker Participation

*You may only enter responses yourself using your own properly registered iClicker.* Cheating on any question jeopardizes the iClicker mark (10 percent of the course grade). All cases will be reported to the Economics Department and to the Office of Student Academic Integrity. A student that “helps” by operating someone else’s remote can expect an equally harsh penalty.

### 6.1.2 iClicker Experiment and Lecture 3 (Sept. 23 & 24)

Our course is one selected for U of T approved research. Because I believe the study is worthwhile and a potential learning experience for our class, I agreed to participate. However, the researcher is Lei Tang ([lei.tang@mail.utoronto.ca](mailto:lei.tang@mail.utoronto.ca)), not me.

You will choose among four DRAWS (A, B, C, and D), which differ in the probability that you are assigned an iClicker marking scheme where nearly every lecture counts for marks – EVERY – or one where fewer lectures count for marks – ODD or EVEN.



**Figure 1:** You choose Draw A, Draw B, Draw C or Draw D. Then you are randomly assigned an iClicker marking scheme with the probabilities given in the figure. Section 6.1.3 explains the EVERY, ODD and EVEN iClicker marking schemes in detail.

During Lecture 3 you will pick DRAW A, B, C, or D via your iClicker.<sup>6</sup> Choose carefully as the decision is final. Also, you will decide whether your data may be used in the study and receive a survey. Lei Tang will keep your data confidential. I will only know your assigned marking scheme and *not* which DRAW you picked, whether you consented, or your survey replies.

No later than Friday, September 26, “MyGrades” in portal will contain your assigned iClicker marking scheme; I will also e-mail it to you. No switching is possible. ***Regardless of your assigned marking scheme, I encourage you to attend all classes and use your iClicker remote during every class you attend.***

<sup>5</sup> Available first-come, first-serve if you have not made this request before. See me and bring your TCard.

<sup>6</sup> If you miss Lecture 3 or come without a correctly registered iClicker, Lei Tang will e-mail you shortly after. You will have 24 hours to respond and a chance to redeem half the lost bonus for Lecture 3. Otherwise you will be randomly assigned the EVERY, ODD or EVEN marking scheme with a 50%, 25% and 25% chance respectively.

### 6.1.3 When Does My iClicker Participation Count?

Some parts of iClicker marking *apply to everyone*. Here are the common lectures:

- For everyone, the first lecture in fall and winter, Lectures 1 and 13, *do not count* for marks.
- For everyone, Lectures 2 and 3 and the special Friday, Feb. 6 session *do count* for marks.
- For everyone, Lectures 12 and 24 serve as a make-up for the fall and winter respectively and replace your lowest iClicker score that term. (If you do worse, it will not count against you.)

If you are assigned the EVERY iClicker marking scheme then all lectures count, except Lectures 1 and 13. If you are assigned ODD then your iClicker replies count only during the common required lectures and all odd numbered lectures (e.g. Lecture 5, Lecture 21, etc.). If you are assigned EVEN then your iClicker replies count during the common required lectures and all even numbered lectures (e.g. Lecture 6, Lecture 22, etc.). To summarize:

- EVERY marking scheme: Lectures 2 - 12, 14 - 24, Feb. 6th count
- ODD marking scheme: Lectures 2 - 3, 5, 7, 9, 11 - 12, 15, 17, 19, 21, 23 - 24, Feb. 6th count
- EVEN marking scheme: Lectures 2 - 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, Feb. 6th count

On the course schedule each lecture is marked EVERY, EVEN, and/or ODD as a reminder. Further, weekly portal announcements will serve as reminders.

### 6.1.4 Roles of Prof. Murdock and Lei Tang

If you have a concern about this course – including the iClicker – this almost always should be directed to me (Prof. Murdock). The only exception is that you need to make your choice of DRAW A, B, C or D known to Lei Tang (and *not* me), inform her of your consent decision, and respond to her survey, which should all be completed in Lecture 3. Direct any specific concerns about the iClicker *research* to Lei Tang([lei.tang@mail.utoronto.ca](mailto:lei.tang@mail.utoronto.ca)). Any other questions, including ones about iClicker marking, should be directed to me.

## 6.2 Grading

Your percentage mark on a test/exam reflects any adjustments to the raw scores such as adding points to everyone’s score or not counting an unduly difficult/confusing question. Your mark, not your raw score, best reflects the quality of your submitted work.

Symbol	Near the part of your answer that is:
X	Incorrect
?	Logically unclear, confusing or illegible
⊕	Imprecise, incomplete, insufficiently shows work (Idea: “plus” more)

For open-ended questions handwritten marks include the points earned and, if applicable, the symbols above. ***For partial credit, part of your answer must be clearly correct, directly relevant to the question asked, AND not contradicted by other parts of your answer.*** Requests for remarking must: (1) Be made IN WRITING and given to me along with your test, (2) Explain WHY more points are justified for each disputed question, (3) Be submitted within two weeks. The entire test will be remarked: your mark can go up, down, or remain unchanged.

### 6.3 Missed Tests

You are expected to complete all work as scheduled in Section 6. 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. Murdock meeting ALL of these specifications.

- (1) Your e-mail is sent BEFORE the start of the missed test.<sup>7</sup>
- (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.<sup>8</sup>
- (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.
- (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.

## 7 Excel Course Module

Instructor Chen ([christy.chen@utoronto.ca](mailto:christy.chen@utoronto.ca)) gives the required Excel Course Module (ECM) that complements our course. You will sign up for nine one-hour 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.

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<sup>7</sup>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.

<sup>8</sup>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.

## 8 Communication

I maintain a course site at <http://homes.chass.utoronto.ca/~murdockj/eco220/> and use the portal. We use Piazza (<https://piazza.com/utoronto.ca/fall2014/eco220y1y/home>) to facilitate more communication. The TAs and I periodically check in to ensure proper usage, flag some postings, and, if time permits, possibly answer some questions. The emphasis is on student-to-student Q & A. Piazza is a complement and NOT a substitute for face-to-face interactions in office hours, before/after/during class, in TA tutorials, in TA review sessions/aid centres, and in study groups. ***Piazza is a substitute for e-mail.***

For private matters or to notify me of course problem (e.g. broken link, typo, TA issues), my e-mail is [jennifer.murdock@utoronto.ca](mailto:jennifer.murdock@utoronto.ca). ***For e-mails asking for a reply, if I can answer briefly without explaining course content or revealing something of general interest, then I will reply within three business days.*** If you receive no reply, check announcements, review the syllabus, post on Piazza, see me in office hours/class, and/or see a TA.

## 9 Academic Integrity, Accessibility & Help

You are expected to uphold your academic integrity. To make sure that you understand academic integrity see <http://www.artsci.utoronto.ca/osai>. For accessibility concerns visit <http://www.accessibility.utoronto.ca/>. If you are having trouble, seek help right away from us and/or the Academic Success Centre <http://asc.utoronto.ca>. For issues that extend beyond our course, contact your College Registrar immediately.

## 10 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>

## 11 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**)<sup>9</sup>; “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.

## 12 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.

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<sup>9</sup>This is an academic journal article co-authored by a winner of the Nobel prize in economics.