

# ECO220Y: Quantitative Methods in Economics, Summer 2015

Prof. Murdock, Economics Department, University of Toronto

First Half: May 11 - June 28

**Sections:** Days, meeting times, rooms; You may attend either section, provided there is space;

**L0101:** TW 10-12, F 10-12, ES B149

**L0201:** TW 2-4, F 12-2, ES B149

**Office hours (GE 312):** Tuesdays 12:45 - 1:45 and Wednesdays 12:45 - 1:45

**Telephone, e-mail:** 416-946-0656, see Section 9

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

**Piazza:** <https://piazza.com/utoronto.ca/summer2015/eco220y1y/home>, see Section 9

**TAs:** Mathieu\*, Juan\*, Jessie\*, Daniel, Congfei, Dhruv (\*Main TAs for first half of course)

## 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.<sup>1</sup> (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, and 2014/15 may be available. The course reserves at Robart's Library have the required text. Older editions are not recommended. **Consider our textbook authors as co-instructors. 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; a one-time registration fee of \$6.99 applies to used remotes. You must use an iClicker *remote*: GO is not permitted.

## 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>.

## 3 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) before class. **Take notes: slides are not notes.** The lecture slides posted on our course site before class are formatted with space for your notes. You may attend L0101 or L0201 regardless of ROSI registration, provided there is space.

Fridays are reserved for tests, TA tutorials, and any make-up classes. I give the TAs weekly lesson plans that focus on important topics. Further, TA tutorials require participation (quizzes). You are free to go to either tutorial section, provided there is space. On Fridays with tests, there are no TA tutorials. However, there are special TA review sessions and TA aid centres before tests.

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<sup>1</sup>To register for MyStatLab (not required) go to [www.mystatlab.com](http://www.mystatlab.com) and use course ID instructo56454.

## 4 Required Readings & Homework

The course site gives readings and homework for each class. *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.

## 5 Summer Session is More than Twice as Fast

This is a Y course with 12 weeks of classes and 2 week for midterms and exams: 14 weeks total. In contrast, the regular academic year has 24 weeks for classes and 6 weeks for midterms and exams: 30 weeks total. You need to devote more than twice as much time per week. However, if you keep up, this can be an advantage. The course material in ECO220Y is highly cumulative and with the intense schedule you have less time to forget. Taking multiple courses in the summer or working full time undermines success. Expect to spend at least 17 hours per week on ECO220Y.<sup>2</sup>

## 6 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

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*, ask a person or look at the solutions. Browsing solutions (and peeking) undermines your study and robs you of practice for the test/exam. Use solutions to grade your answers.

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<sup>2</sup>During the regular academic year a full-time student takes 5 courses per term. Presuming full-time means at least 40 hours per week, that is 8 hours per course per week. During the summer (at more than double-speed) that means 17 hours per course per week.

*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.

## 7 Marking Scheme and Assessments

For tests and the final exam you must bring your TCard and you may bring a non-programmable calculator. Test #1 is planned to be multiple-choice. Test #2 is planned to be open-ended questions. On Test #2, one of the questions (with multiple parts) is planned to require a longer written answer where you must interpret and assess quantitative results (e.g. tables, figures, equations, STATA output, etc.). The final exam is cumulative and covers the entire course. For the exam, the approximate weights are about one fifth on the first-half material and about four fifths on the second-half material. The exam is typically a mix of question formats and is planned to include a part that requires a longer written answer. You may have extra background reading before tests and the exam. For tests and exams you will be given aid sheets: formulas and relevant statistical tables. ***A full copy of the aid sheets for the entire course is on the course site. Each week make note of what we have covered so far. Have a copy of the aid sheets and a calculator handy for all classes and TA tutorials.***

Assessment	% of Grade	Length	Due Dates
<i>First Half of Course (May 11 - June 28):</i>			
Test #1	12.5 %	110 min.	Friday, June 5, 10:10 - noon
Test #2	17.5 %*	3 hrs.	June 22 - 26, <a href="#">TBA by A&amp;S</a>
Weekly Graded Participation:			
iClicker	5 %	–	In lectures: May 12 – June 17
Portal quizzes	2.5 %*	–	Online: May 18, May 25, June 1, June 8, June 15, June 22
TA tutorial quizzes	2.5 %*	–	In TA tutorials: May 15, May 22, May 29, June 12, June 19
*Possible re-weighting: The weight for portal quizzes and/or TA tutorial quizzes will move to Test #2 if your Test #2 mark is higher. Hence, Test #2 may be worth up to 22.5 %.			
<i>Second Half of Course (June 29 - August 17):</i>			
Test #3	15 %	TBA	TBA by Prof. Yu
Excel Test	5 %	50 min.	TBA in early Aug. by Prof. Chen
Final Exam	40 %	3 hrs.	Aug. 11 - 17, 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 seeking feedback. ***Only a fraction of your efforts can be formally graded by us: you are expected to grade yourself against posted solutions for regular homework and old tests/exams.*** Graded assessments ask you to *do* statistics: make sure your practice time is focused on *doing* rather than passively reviewing and reading.

## 7.1 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 or L0201: your iClicker will work.***<sup>3</sup> It is your responsibility to: correctly register your iClicker, bring it to class, arrive on time, and stay for the entire class. You may collaborate with your classmates: in fact, you are encouraged to.

Each lecture, except for the first lecture (Lecture 1), counts for marks. Lecture 12 serves as a make-up and replaces your lowest iClicker score. (If you do worse, it will not count against you.)

To register (or re-register) go to <https://www1.iclicker.com/register-clicker/>. You MUST use your **UTORid** – NOT your student # – as your “Student ID.”<sup>4</sup> Correctly register right away. However, you *must* properly register before June 17 (or your iClicker mark will be zero).

A green light illuminates on your iClicker remote when your response is received by an iClicker base: make sure to vote only while voting is active in our class. A 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/>.

***How can I check if my iClicker is registered properly and I’m earning marks?*** There are TWO separate requirements for you to earn iClicker marks: (1) attend class, select your answer while voting is active in our class, and get a green light and (2) properly register your remote on the iClicker website (with your UTORid). You can check (1) while in class. To check (2), go to <https://www1.iclicker.com/register-your-remote/remote-id-lookup-tool/>, enter your UTORid, and make sure your registration is active.<sup>6</sup>

***You may only enter responses yourself using your own properly registered iClicker.*** Cheating on any question jeopardizes your entire iClicker mark. 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.

## 7.2 Portal Quizzes

Portal quizzes give you an extra incentive to keep up with our course *every week*. Questions ask about material covered that week or earlier weeks. The plan is short-answer (e.g. multiple-choice) questions that may involve more work than the iClicker questions asked in class (which usually do

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<sup>3</sup>If you attend the same lecture more than once, only the first counts towards your mark.

<sup>4</sup>Our course follows U of T policy on iClicker registration: <http://www.teaching.utoronto.ca/teaching/essentialinformation/educationaltechnology/iclicker/registering-crs.htm>.

<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 can only find your registration by entering your student number as your Student ID then you are NOT registered properly. You will have a mark of 0 unless you re-register following the instructions above. Once your registration is correct, you will get credit for *all* of your iClicker participation including earlier participation.

not require a calculator). Like the iClicker, reasonable collaboration is allowed. However, your questions may vary from others so only real collaboration (not simply copying) is helpful. Also, like the iClicker, some partial marks are awarded for attempting each question even if your answer is wrong. Prior to starting each quiz, make sure you have completed the assigned readings and homework for that week's lectures. Also, spend about 10 minutes editing the the notes you took in class that week. Make sure you have your calculator, aid sheets, notes, textbook, and homeworks ready before starting. If you are well prepared, each portal quiz should take 30 minutes or less to complete.

Portal quizzes become active each Wednesday at 6:00pm. You have until 6:00pm on Monday, which is 5 calendar days, to complete it. ***Once you begin, you may not exit the quiz: you have a maximum of 60 minutes to finish.*** The first portal quiz (on Lectures 1 and 2, due by May 18) does not count towards your mark. Of the remaining five portal quizzes, the best four count. However, beyond that (and the possible re-weighting (\*) in the marking scheme), there is no further accommodation for late submissions, missing a portal quiz, or technical difficulties. Start it well before the deadline and when you have the uninterrupted time needed to finish it.

### 7.3 TA Tutorial Quizzes

TA tutorial quizzes give you yet one more incentive to actively engage with our course. Typically near the end of TA tutorials, after an interactive review of key skills and concepts (often with fresh examples), TAs will distribute short one-page quiz papers and advise you of your time limit (e.g. 20 minutes).<sup>7</sup> Topics can include material covered that week or earlier weeks. The plan is for open-ended questions that focus on key skills and concepts. Like the iClicker and portal quizzes, collaboration is allowed. TAs will mark these using the *lenient* marking rubric below.

Mark	Meaning (Numeric Percentage Mark)
0	Not submitted (0 %)
✓-	Paper shows little to no effort to answer the question(s) (40 %)
✓	Paper shows effort to answer the question(s), but major errors/omissions (65 %)
✓+	Good answer overall, but some errors/omissions (85 %)
✓++	Excellent answers, possibly with minor errors/omissions (100 %)

Every TA tutorial has a quiz: the marking scheme in Section 7 gives the dates. Of the five TA tutorial quizzes, the best four count. However, beyond that (and the possible re-weighting (\*) in the marking scheme), there is no further accommodation for missing a TA tutorial quiz.

### 7.4 Weekly Graded Participation: Only a Fraction of Your Weekly Work

Remember, you should average at least 17 hours per week on our course this summer. Attending 4 hours of lecture (and doing iClicker participation) and 2 hours of TA tutorials (and doing TA tutorial quizzes) and spending about 0.5 hours on portal quizzes gets you less than 40 percent there. The rest of the time should primarily be spent on actively solving problems (regular homework and old test/exam questions when reviewing) and working with the readings. Most of your preparatory work will be graded only indirectly (in other words, in tests and exams).

<sup>7</sup>However, TA tutorial quizzes could happen at any point during the tutorial, including the beginning or middle.

## 7.5 Missed Tests

You are expected to complete all work as scheduled in Section 7. In exceptional circumstances you may request up to *one* make-up test: there is no accommodation for missing both Tests #1 and #2. 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>8</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>9</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.

## 7.6 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)

<sup>8</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>9</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.

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.*

### 7.6.1 Remark Requests

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.<sup>10</sup> The entire submission will be remarked: your mark can go up, down, or remain unchanged.

## 8 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 five Excel tutorial sessions (90 minutes each) held in a computer lab from late June through August. (These are separate from regular TA tutorials.) These help you prepare for the Excel Test in early August that you take in a computer lab. In June you will be notified about how to sign up for an Excel tutorial section via the portal: a range of times and days will be available on a first-come, first-served basis.

## 9 Communication

Our main course site is <http://homes.chass.utoronto.ca/~murdockj/eco220/> and we use the portal. We use Piazza (<https://piazza.com/utoronto.ca/summer2015/eco220y1y/home>) to facilitate more communication. The TAs and I periodically check Piazza to ensure proper usage, flag some postings, and possibly answer some questions. The emphasis is on student-to-student Q&A. Piazza is a complement to face-to-face interactions in office hours, class, TA tutorials/review sessions/aid centres, and 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.* For any question that would interest other people (e.g. a question about an upcoming test, a course concept, etc.), you must post on Piazza if you are hoping for an electronic reply. If you receive no reply to your e-mail, check announcements, review the syllabus, post on Piazza, see me in office hours/class, and/or see a TA.

## 10 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

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<sup>10</sup>For work on Crowdmark, your written explanation can be an e-mail with a link to your work.

us, your College Registrar, and/or the Academic Success Centre <http://asc.utoronto.ca>. For issues that extend beyond our course, contact your College Registrar immediately.

## 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 first half of the course and the rest in the second half.

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**); “The Standard Normal Table: Read it, Use it”; and “Logarithms in Regression Analysis.” These required readings (and any extra ones) will generally be provided electronically.

## 12 First Half and Second Half

Except where otherwise stated, this syllabus addresses the first half of the course from May 11 to June 28. The second half of the course, from June 29 to August 17, will be given by Prof. Yu ([victor.yu@utoronto.ca](mailto:victor.yu@utoronto.ca)). Please direct any further questions about the second half to him.