ECO220Y: Quantitative Methods in Economics, 2015/16
Prof. Murdock, Economics Department, University of Toronto

Sections: days, meeting times, rooms
> **L0201:** Wed 10-12, AH100; Fri 9-11: 9-10, AH100(Fall)/BR200(Winter)
> **L0301:** Wed 2-4, KP108(Fall)/FG103(Winter); Fri 9-11: 10-11, KP108(Fall)/FG103(Winter)
> **L0401:** Thur 10-12, AH400; Fri 9-11: 10-11, AH100(Fall)/BR200(Winter)

Office hours (GE 312, 3rd floor, 150 St George): Tuesdays 10-noon (Fall); Tuesdays 2-4 (Winter); Any changes to scheduled office hours will be posted on the course site: please check

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/fall2015/eco220y/home, see Section 9

TAs: Mathieu (Head TA), Hammad, Thomas, Kevin, Juan, Samuel, Carolyn, Congfei, Valerie

Economics Study Centre (GE 110): MTWR 11-7 and F 11-3, 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.[1] 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. Consider our textbook authors as co-instructors. Using an iClicker remote is required. You may buy a used iClicker, 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.

2 Prerequisites

ECO100Y1(67%)/ ECO105Y1(80%); MAT133Y1/(MAT135H1,MAT136H1)/MAT137Y1/MAT157Y1. An administrator will remove anyone missing prerequisites. I cannot waive prerequisites: http://www.economics.utoronto.ca/index.php/index/undergraduate/load/prerequisites.

3 Weekly Lectures, Fridays, our TA Support and our Head TA

Wednesday and Thursday meetings use PowerPoint and require your participation (iClicker). The lecture slides are on our course site before class. You may print the lecture slides (black and white is fine): these include blank space for notes. ***Take notes: slides are not notes. You may attend L0201, L0301 or L0401, provided there is space.*** Fridays are for TA tutorials, tests, and any special classes. I give the TAs weekly lesson plans for TA tutorials, which are 50 minutes. 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 TA review sessions and TA aid centres before tests/exams: details to be posted on portal announcements. Our Head TA is Mathieu Marcoux (mathieu.marcoux@mail.utoronto.ca). He manages our team of TAs, portal announcements, and portal quizzes. You may mostly notice his great review sessions before tests and exams.

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[1]To register for MyStatLab (not required) go to www.mystatlab.com and use course ID instructo52404.

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 (sometimes in the margins). Take the boxes, including "Just Checking," seriously. Chapter openers and closers such as "What Can Go Wrong?" are always part of the required reading. Complete homework soon after each lecture.

5 Learning Objectives: Expected Depth of Understanding

(1) Translate between plain English and statistical terms and concepts: identify key information regardless of wording and distinguish incorrect statements from correct ones

(2) 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

(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) Read and critically evaluate analyses without being dazzled by data, methods or 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 that *directly* answer asked questions

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

Topics addressed in lectures, homework, or required readings 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, readings, etc.). You may hone your test-taking skills and assess the required depth of understanding by working with old tests.

6 Academic Integrity, Accessibility & Help

You are expected to uphold your academic integrity: see http://www.artsci.utoronto.ca/osai. For accessibility concerns visit http://www.studentlife.utoronto.ca/as. If you have trouble, seek help right away from us, your College Registrar, and/or the Academic Success Centre http://www.studentlife.utoronto.ca/asc. **For any issues that extend beyond just our course, contact your College Registrar immediately.**

7   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 during the Winter term (Jan. - Apr.). (These are separate from regular TA tutorials.) These help you prepare for the Excel Test in late March or early April 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.

8   Marking Scheme

The table below shows how course grades will be calculated. ***For all tests and the exam, bring your TCard, pencils, erasers, and a non-programmable calculator.*** Tests #1 and #5 are planned to be multiple-choice. Tests #2, #3, and #4 are planned to be open-ended questions. Your overall mark on the five tests will be your average mark on the best of 4 of the 5 tests. ***However, you are expected to write ALL FIVE term tests.*** All sections write the same cumulative final exam, which is typically a mix of question formats. For one or more tests and the final exam, one of the questions (with multiple parts) is planned to require a longer written answer where you interpret and assess quantitative results (e.g. tables, figures, STATA output, etc.). You may have extra background reading and study materials before tests and the exam. You will be given aid sheets: formulas and relevant statistical tables. The aid sheets for the entire course are on the course site: bring a copy and a calculator to classes and TA tutorials.

Assessment	Weight	Length	Due Dates
Best 4 of 5 Term Tests	50 %	–	–
Term Test #1	–	110 min.	Friday, Oct. 30, 9:10 - 11 am
Term Test #2	–	110 min.	Friday, Dec. 4, 9:10 - 11 am
Term Test #3	–	110 min.	Friday, Feb. 5, 9:10 - 11 am
Term Test #4	–	110 min.	Friday, Mar. 11, 9:10 - 11 am
Term Test #5	–	110 min.	Friday, Apr. 8, 9:10 - 11 am
Weekly Participation: Fall	7.5 %*	–	Sept. 21 – Dec. 7
Weekly Participation: Winter	7.5 %*	–	Jan. 11 – Apr. 11
Excel Test	10 %	1 hr.	TBA in Mar/Apr
Final Exam	25 %	3 hrs.	Apr. 12 - 29, TBA by A&S

> *Possible re-weighting: If your "best 4 of 5 term tests" mark *and* your final exam mark are *both* at least 60% and are *both* higher than your weekly participation mark (either term), then the weight for that weekly participation will move to the *lower* of the two. This can apply to one or both terms. See Section 8.1.4 for the rationale.

Why is there so much term work? In ECO220Y 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 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 that your practice time is focused on *doing* rather than passively reviewing and reading.

8.1 Weekly Participation

A major goal of weekly participation is to nudge you towards successful study strategies. After each term, I will post your overall weekly participation mark in MyGrades on portal. It is based on a combination of portal quizzes and iClicker class participation. Each is discussed next.

8.1.1 iClicker Class Participation: During All Lectures

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 L0201, L0301 or L0401: your iClicker will work.**[2] 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.

Every lecture, except Lecture 1, counts for marks. Lectures 12 and 24 serve as make-ups for each term and replace 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/.[3] You MUST use your **UTORid** – NOT your student # – as your "Student ID."[4] You *must* properly register before the last class (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. The *last* answer you press (while voting is still active) is graded. If you forget your iClicker, I usually bring a backup.[5] Nearly all strange remote behavior can be fixed by replacing ALL batteries. For support call 866-209-5698 or visit http://support.iclicker.com/.

How can I check if I am earning marks with my iClicker? There are TWO separate requirements: (1) attend class, answer while voting is active, and get a green light and (2) properly register on the iClicker website (with your UTORid). Check (1) during 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.[6]

You may only enter responses yourself using your own properly registered iClicker. Cheating on any question jeopardizes the entire weekly participation mark (15 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.

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[2]If you attend the same lecture more than once, only the first counts. Friday TA tutorials do not involve iClickers.

[3]A one-time registration fee of $6.99 applies to used remotes you have not registered before.

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

[5]Available first-come, first-serve if you have not made this request before. See me and bring your TCard.

[6]If you can only find your registration with your student number then you are NOT registered properly. Once you re-register correctly, you will get credit for *all* earlier participation.

8.1.2 Portal Quizzes: Due Online Every Monday at 6:00pm

Portal quizzes help you keep up with our course *every week*. Questions are planned to be short-answer. A common question format requires you to type an exact numeric answer. Portal quiz questions typically require more work than the iClicker questions in class (which usually do 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 questions even if your answer is wrong. Prior to starting each quiz, make sure you have completed the assigned readings and homework for the most recent (and earlier) lectures. Also, spend about 10 minutes editing the notes you took in class that week. Make sure your calculator, aid sheets, notes, textbook, and homeworks are handy before starting. If you are well-prepared, each portal quiz should take 45 minutes or less to complete.

Portal quizzes become active each Thursday at noon. You have until 6:00pm on Monday, which is 4.25 calendar days, to complete it. ***Once you begin, you have a maximum of 60 minutes to finish.*** There will be one make-up portal quiz that opens Friday, December 4 at noon and is due at 6:00pm on Monday, December 7 and one make-up portal quiz that opens on Friday, April 8 at noon and is due at 6:00pm on Monday, April 11.[7] Each make-up may replace up to two of your lowest portal quiz marks (including 0's) for the corresponding term. ***However, beyond the make-up quizzes (and the possible re-weighting (*) in the marking scheme), there are no further accommodations for reasons such as technical difficulties (browser problem, power outage, laptop malfunction, software issue, etc.), lateness, forgetting about it, typing errors, improper rounding, failing to type your answer in the requested format, or unexpected interruptions after starting the quiz***. Start each portal quiz well before the deadline and when you have the uninterrupted time needed to finish it.

How can I see my results for each portal quiz? After the due date, you can see the questions and your answers by going to My Grades, clicking on the title of the quiz (which will open the assessment details in a new window), and then clicking on your grade (under Calculated Grade). MyGrades will show only your *raw score* on the quiz (portal does not allow partial credit for wrong attempts, but I do). Your overall weekly participation mark (that I calculate using portal quiz marks and iClicker marks) will be posted on MyGrades after each term is complete.

8.1.3 Weekly Participation: Only a Fraction of Your Weekly Work

You should average at least 8 hours per week on our course.[8] Spending 110 minutes participating in lecture, 50 minutes participating in TA tutorials, and up to 60 minutes completing portal quizzes gets you less than halfway there. The remaining time should be spent primarily 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).

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[7]During these make-up periods, earlier portal quiz results will be temporarily unavailable.

[8]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.

8.1.4   Possible Re-Weighting of Weekly Participation

Everyone is strongly encouraged to do their best possible work each week on the portal quizzes and iClicker questions and to take full advantage of the make-up opportunities automatically granted to everyone. The possible re-weighting in the marking scheme in Section 8 *only* accommodates people who *consistently* do at least adequate work (C-) on term tests and the final exam but, for whatever reason, do not do at least that well on weekly participation. In that circumstance, and if it would improve a person's course grade, I will move the weight for weekly participation to the *lower* of the two ("best 4 of 5 term tests" mark or final exam mark), which again highlights the need for consistency. I expect this possible re-weighting would apply to only a small fraction of students and that most people who regularly make a good effort on weekly participation will find that it helps (not hurts) their course grade.

8.2   Missed Term Work

You are expected to complete all required work as scheduled in Section 8. The marking scheme already includes multiple accommodations for missed term work.[9] The "best 4 of 5" policy accommodates students that cannot write one test due to illness, injury, or personal problems and accommodates students who write a test in difficult circumstances and do poorly. (Note: If you are going to be late to a test, you are expected to show up late and see me.) The marking scheme also includes accommodations for missed portal quizzes or iClicker participation: there are make-ups for each. The "best 4 of 5," iClicker, and portal quiz accommodations are automatically applied to everyone: you do NOT need to contact me with a request and/or excuse. Also, there is a make-up for the Excel test (with details to be posted in the ECM syllabus).

Accommodations beyond those discussed in the previous paragraph are almost always *not* possible. The only potential exceptions are *extremely specific*: **(1)** I am asked to consider extraordinary accommodations by a student's College Registrar who has been contacted by the affected student *at the earliest possible date* after the *start* of any *ongoing and substantial* injury, illness, or personal problems seriously affecting the student's ability to complete term work or **(2)** I am contacted by the student *very far in advance* about a conflict (*not* related to injury, illness or personal problems) (e.g. a student athlete with international events who notifies me in the second week of classes in September). **For ongoing injury, illness, or personal problems (lasting more than a few days) you must contact your College Registrar immediately.** For any extraordinary circumstances, I will consider whether accommodations are possible that still meet all course requirements or whether the student must be advised to drop the course and consider retaking it when able to complete required work. Any extraordinary accommodations are at the sole discretion of the instructor and may involve a cumulative open-ended make-up test and may be contingent on final exam performance and/or performance on other term work.

8.3   Grading

Your percentage mark on a test, exam or other term work reflects any adjustments to the raw scores such as adding points to everyone's score or not counting an unduly difficult/confusing

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[9]This section applies to missed *term work*. Any accommodation for the *final examination* requires a student to formally petition A&S: see http://www.artsandscience.utoronto.ca/ofr/calendar/Rules_&_Regulations.html.

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
$\oplus$	Does not address all parts of the question and/or insufficiently shows work (Idea: "plus" more)

For open-ended questions, TAs write the points earned and, if applicable, the symbols above. For some questions TAs may also write comments. For questions with full solutions you are expected to *critically evaluate* your answer compared to posted solutions. **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.**

8.3.1 Remark Requests

Remark requests must: (1) Be made in an E-MAIL to me, subject "remark request," that includes the *link* to your paper in Crowdmark (*no* attachments), (2) Explain WHY more points are justified for each disputed question, (3) Be sent within TWO WEEKS of the work's return to the class. The entire submission may be remarked: your mark can go up, down, or remain unchanged. Any remark requests are batch-processed sometime *after* the two-week deadline, not immediately.

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/fall2015/eco220y/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), my e-mail is 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 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. On the course site I will alert you to specific peer mentors that took ECO220Y with me and did really well. 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"

Make sure to visit the Readings folder in portal. Required readings beyond 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**); "Logarithms in Regression Analysis" (a required supplement to our textbook that I wrote); "The Standard Normal Table: Read it, Use it" (another required supplement to our textbook that I wrote). Optional (and recommended) reading, sometimes referenced in lectures, is "Belief in the Law of Small Numbers" by Amos Tversky and Daniel Kahneman published in 1971 in *Psychological Bulletin* (**TK71**).[10]

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