

Quantitative Methods in Economics (ECO220Y), Summer 2011

First Half: May 16 - June 30

Sections:

L0101 T/R 2:10-4:00 (BA 1180) and M 3:10-5:00 (BA 1180)

L5101 T/R 5:10-7:00 (BA 1130) and M 5:10-7:00 (BA 1180)

Instructor: Prof. Murdock, 1st, May 16 - June 30; (Prof. Yu, 2nd, July 4 - Aug. 19)

Telephone: 416-946-0656. To leave a message, please clearly say your name and repeat your telephone number twice. I will return your call within 2 business days.

Drop by “office hours”: Wednesdays 4:30 - 5:30, 150 St. George St., Room 312

Drop by “coffee hours”: T/R 4:20 - 4:55, Mega Bites in BA, follow signs for “Café”

Drop by “class hours”: Please approach me before class or during the break. Also, I can stick around after class for Section L0101.

E-mail: See Section 12

Head TAs: Branko Boskovic and Rita Pivovarova

Course Websites: chass.utoronto.ca/~murdockj/eco220/ and portal

1 Academic Integrity, Civility, Accessibility & Help

You are expected to behave with integrity and civility in all interactions. Make sure your style of expression when speaking, writing, or acting is appropriate for an academic environment and shows respect for your classmates and instruction team. For any accessibility concerns, please visit <http://www.accessibility.utoronto.ca/> now to gather information and make arrangements. If issues arise please seek help right away by contacting us and/or using U of T's academic support services listed at <http://life.utoronto.ca/get-smarter/academic-support.htm>. For issues that extend beyond our course please seek the help of your College Registrar.

2 Prerequisites

An administrator will remove you for 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 First Half and Second Half

Unless otherwise stated, this syllabus addresses the first half of the course from May 16 to June 30. The second half of the course from July 4 to August 19 will be given by Prof. Yu. Please direct questions about the second half to him.

4 Textbook and iClicker

The required textbook for the course – both halves – is a custom first Canadian Edition of *Business Statistics* by Noreen Sharpe, Richard De Veaux, Paul Velleman, and David Wright (2011) complete with a student solutions manual and access to MyStatLab (ISBN-10: 0132841401). This custom package is available at the U of T Bookstore. Other editions and books are not substitutable.¹ An iClicker is also required.

5 Learning Objectives

Learning objectives help communicate course expectations to you. To make these meaningful and current, I review recent assessments to identify what we ask students to do.

- (1) Translate between plain English and statistical terms and concepts: identify key information regardless of wording or presentation, 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) Craft clear, concise and convincing written arguments
- (11) Verbally explain statistical concepts to others and support your conclusions
- (12) Explain and apply the concepts in an academic journal article written by a Nobel laureate

5.1 What does it mean to understand?

The verbs in the learning objectives indicate what you are expected to do to demonstrate that you understand the material at the depth required by our course. Superficial understanding can be feigned by memorization: memorizing definitions, explanations, old solutions or relevant examples. This approach will not prepare you to do well on the course assessments. Instead, practice your skills using old tests and homeworks *without* using the solutions as a crutch. Deepen your understanding by reflecting on these and asking yourself what course concepts you have used. Make sure you think about each week’s key concepts and how they tie into earlier weeks and subsequent ones.

¹An exception is the full first Canadian edition (ISBN-10: 0321754247) but it is usually more expensive.

5.2 “What do I have to know for the tests?”

If a concept, skill, or topic is addressing in a lecture, a tutorial, the required reading, a course handout, *or* a course assignment then it is fair game for an assessment. Major concepts will appear multiple times but not necessarily in every format and venue.

6 Course Websites

Prof. Murdock maintains the course website at chass.utoronto.ca/~murdockj/eco220/ whereas TAs, the ECM, and the second half of the course use the portal.

7 Lecture Format

Lectures, given on Tuesdays and Thursdays, are most often PowerPoint presentations with participation opportunities (i.e. using an iClicker). You may visit the course website, print out the lecture slides, and bring them to class. Black and white or gray scale print-outs are fine. You need to **take your own notes**: lecture slides are not lecture notes.

8 TA Tutorials

TA Tutorials – an important component of this course – are held in the Monday time slot. These will be highly interactive: come ready to work. Your TAs and I have prepared self-tests, simulations, team assignments, and group presentations. Your participation will count directly towards your course grade in addition to helping you prepare for tests. It is your responsibility to **initial a sign-in sheet at each tutorial and show your TCard**. In general you should bring your textbook, notes, handouts, a calculator, a pencil, eraser, and some note-taking paper. Watch for TA announcements and/or e-mails through the portal about what you need to do to prepare for each tutorial. Tutorials will be “unplugged” (i.e. the TAs will not use the data projector and iClickers). However, students who wish to bring their laptops are welcome to do so.

9 Readings and Homework

Readings and homework are posted on the course website for each class meeting. You are expected to complete the readings before the related lecture and these are fair game for iClicker questions. As you read, complete the “just checking” segments. Also, the chapter closing segments such as “what can go wrong” and “ethics in action” are part of the required reading.² The assigned exercises and problems are best completed after the

²These are always part of the required reading just like the introduction but will not be separately listed with the specific reading assignments for each class.

related lecture. A word of caution about solutions: when considering peeking at the solutions, remember that graded assessments confront you with problems without hints.

10 Marking Scheme and Assessments

Assessment	% of Grade	Length	Dates, Location, Time
iClicker lecture participation	8 %*	–	Practice: first lecture Graded: May 19 - June 23
TA tutorial participation	4 %*	–	Mondays: May 16, May 30, June 6, June 20; other HW
Term Test #1	14 %	80 min.	Monday, June 13, TBA 5:10 pm - 6:30 pm
Mid-Term Test	22 %	110 min.	Tuesday, June 28, TBA 5:10 pm - 7:00 pm
* If you have written both term tests as scheduled above then up to half the iClicker and/or TA Tutorial participation weight will be evenly reallocated to the two term tests if that would improve your grade and if your academic integrity is beyond question.			
Term work for Second Half	16 %	TBA	TBA by Prof. Yu
Excel Test	6 %	TBA	TBA in mid-July by Prof. Chen
Final Exam	30 %	3 hrs.	Aug. 15 - Aug. 19, TBA by A&S

For Term Test #1 and the Mid-Term you cannot arrive late (without penalty). You may bring your own non-programmable calculator and you must bring your University of Toronto TCard. Multiple choice and other formats are used. Because of the nature of our course material, assessments are cumulative.

10.1 iClicker Lecture Participation

Lectures include iClicker questions. These encourage you to prepare for class, to talk (about statistics) with your classmates, and to identify misunderstandings. Your iClicker responses will earn points even if your answer is incorrect. You will earn a bit more points for a correct answer. A mark of 0 points is assigned to each unanswered question. For questions that have no incorrect answer you earn points for responding. Point values can vary across questions. You can start earning points the second lecture.

To register go to <http://www.iclicker.com/registration/>, type your official name, your **UTORid**, and your iClicker remote id. It is *your responsibility* to: correctly register your iClicker, bring it to class, bring any aids you need (calculator, textbook, statistical tables), arrive on time, and stay for the entire lecture. If the green vote status light illuminates

when you submit a response then it has been successfully recorded.³ If you forget your iClicker, Prof. Murdock usually brings two loaners.⁴ You may attend L0101 or L5101.⁵

Behave with integrity when using your iClicker. You may only enter responses yourself using your own properly registered iClicker. iClicker lecture participation is a single assessment worth 8 percent of your course grade. A student suspected of cheating on any question jeopardizes his/her entire participation mark and possibly much more. 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 iClicker can expect an equally harsh penalty. Protect your friends: do your work.

10.2 TA Tutorial Participation

Section 8 describes the TA tutorials. Attendance is a prerequisite for participation but TAs will also note exceptional efforts or poor efforts in forming your tutorial participation mark.

10.3 Grading

A machine marks multiple choice questions. Your mark and machine-read responses will be posted on the course website as soon as possible. For long answer questions handwritten marks include the points you earned and, if applicable, the following symbols.

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

To earn partial credit requires that part of your answer is 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 entire assessment, (2) Explain which questions were improperly marked, (3) Be submitted within one month. The entire assessment will be remarked: your mark can go up, down, or remain unchanged. These conditions do not apply to clerical errors such as adding up your score wrong. If a clerical error occurs, please let me know as soon as possible.

10.3.1 Marks versus raw scores

Your mark on a piece of term work reflects any class-wide adjustments in the raw percentage scores. Some examples: adding three points to everyone’s score or not counting an unduly difficult/confusing question. Any adjustments will be explained to the class. Your mark, not your raw score, best reflects the quality of your submitted work.

³A red vote status light indicates a problem.

⁴These are available first-come, first-serve to students who never requested one before. See me (when it would not interrupt the lecture) to give a deposit and to do the temporary registration.

⁵If you attend both, only the first section will count towards your mark.

10.4 Missed Term Work

Term work is a crucial component of our course. If you cannot complete the term work as scheduled, consider re-taking this course when you are able. There is no accommodation for missing more than one term test: any test missed beyond one automatically earns a mark of zero. There is no accommodation for missing more than three days of term work (e.g. one lecture, one tutorial and one test). If you miss term work and wish to request accommodation then you are responsible for accurately completing **all** of these steps.

First Step: Write a letter to Prof. Murdock meeting **all** of the following specifications.⁶

- (1) It identifies what term work you missed. What was the work, the date, and **the topics covered**?
- (2) It describes what efforts *you* have made to compensate for the missed work and topics so that you remain up-to-date with the course.
- (3) It explains why you missed the term work.
- (4) It lists the other courses are you taking and the names of your other professors. It identifies any term work you submitted in other courses on the same day or two days before or after the missed term work in our course.
- (5) The last sentence in the body of your letter is: “I understand that it is a punishable academic offense to present false information in support of my request for accommodation for missed term work.”
- (6) It is word-processed and comfortably fits on one side of a standard 8.5 by 11 inch sheet. The writing is clear, concise, and appropriate for an academic setting. Everything except the last sentence is written in your own words and there is no cutting-and-pasting from course materials.
- (7) The letter closes with your signature and your name, student number, e-mail address (U of T), and telephone number printed (word-processed) below it.

Second Step: Give a signed hardcopy of your letter **in-person** to Prof. Murdock or a Head TA **no later than one week** after the missed work.

Third Step: Write the cumulative make-up test on Wednesday, July 6, 9:00 - 11:00 am. A missed make-up automatically earns a mark of zero. The mark on the missed work will reflect the make-up test result and, to a lesser extent, the quality of your letter.

10.5 Excel Course Module

Instructor Chen (christy.chen@utoronto.ca) will give the required Excel Course Module (ECM) that complements our course. The ECM will start in early June; you will have a

⁶The letter is the required documentation. I have found documents such as medical certificates unhelpful because medical professionals focus on serving their patients, not defending academic integrity at U of T.

chance to sign up for Excel training sessions held in a computer lab. (These are separate from regular TA tutorials.) While seated at a computer, you will learn how to do statistical analyses using an augmented version of Excel. These help you prepare for Instructor Chen's graded Excel Test to be scheduled mid-July that you take in a computer lab. The ECM shares our portal course site.

11 Topics and Required Readings

The course covers the following chapters in the required textbook. Within each chapter all sections are required with exceptions noted below. In the first half we will reach Chapter 11. When the second half with Prof. Yu begins on July 4th you will start at Chapter 12.

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: Randomness and Probability

Chapter 7: Scatterplots, Association, and Correlation

Chapter 8: Introduction to Linear Regression

Chapter 9: Random Variables and Probability Distributions (Excluding Sections 9.7 The Poisson Distribution and 9.11 The Exponential Distribution)

Chapter 10: Sampling Distributions

Chapter 11: Confidence Intervals for Proportions (Excluding Section 11.5 A Confidence Interval for Small Samples)

Chapter 12: Testing Hypotheses About Proportions

Chapter 13: Confidence Intervals and Hypothesis Tests for Means

Chapter 14: Comparing Two Means

(Chapter 15: Paired Samples and Blocks (this chapter included if time permits))

Chapter 16: Inference for Counts: Chi-Square Tests (Only Section 16.5 Confidence Intervals for the Difference of Two Proportions)

Chapter 18: Inference for Regression

Chapter 19: Understanding Residuals

Chapter 20: Multiple Regression (Excluding Section 20.7 The Logistic Regression Model)

Chapter 21: Building Multiple Regression Models

In addition to the textbook there are two significant supplemental readings: we will provide you with hardcopies. One is described in Section 13 and the other is Chapter 1, "Economic Questions and Data," from *Introduction to Econometrics, Third Ed.*, 2011, by James H. Stock and Mark W. Watson (SW11). Other short readings and handouts are provided throughout the course in either electronic or hardcopy format.

12 Communication

To help communicate with the class, the TA's and I will use announcements during lectures/tutorials, postings on the website, and in some cases e-mail to the class. For back-and-forth communication with individual students I have found e-mail to be inappropriate. You should not expect a personal reply if you e-mail me with a request. If you have a private concern or if you would like a personal reply then please speak to me during office hours or class hours (or if necessary, by telephone). In contrast, if there is an issue related to the course that you think I should know about, please feel free to notify me via e-mail. In other words, you can use e-mail with me the same way I do with you: to let the other know about something but not as part of a back-and-forth discussion. For the latter, we need to talk.

13 Attached Article: TK71

Attached to this syllabus is an academic journal article co-authored by a winner of the Nobel prize in economics: "Belief in the Law of Small Numbers" by Amos Tversky and Daniel Kahneman published in 1971 on pages 105 - 110 of Volume 76(2) of the *Psychological Bulletin*. We refer to it as "TK71." By the end of this course (both halves) you will be able to understand it and reproduce most of the calculations. But more than that, I hope that the way you think about probability, statistics, and randomness will be forever altered. As a first step, I will give you a reading guide early in the course to help with your first reading of it in preparation for a TA tutorial: watch for announcements.