ECO220Y1Y, Introduction to Data Analysis and Applied Econometrics

2025/26: Sections L0101, L0201, and L0301 with Prof. Murdock

Economics Department, University of Toronto

1 Overview of ECO220Y1Y

Welcome to my favorite course! You have the chance to gain essential analysis and exposition skills and learn about what many economists really do. Ours is a practical course. If you're curious about how to analyze data, which kinds of research questions economists ask, and how to present and interpret results, then this is the course for you. You'll need to hone your preexisting reading, writing, and quantitative analysis skills. While some of the new skills are challenging and require substantial practice, your classmates, TAs and instructors are your allies. Make an extra effort to socialize and form new connections.

Our course is coordinated across the seven lecture sections. Sections LEC0101, LEC0201, and LEC0301 share this syllabus. All seven sections write a common final exam and do the Data Analysis Course Module (DACM) – spaced over both terms – where you dive into real data and research and replicate key findings.

2 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, hypotheses, equations, calculations, fully-labeled graphs, diagrams

(3) Proficiently read output from various statistical software packages including Stata

(4) Fluently use Excel to analyze data and replicate published results

(5) Get started writing code in Stata – a *do-file* – for basic data manipulation and statistical analyses

(6) Correctly interpret quantitative results for a non-technical or technical audience

(7) Draw valid statistical conclusions and steer clear of common pitfalls

(8) Explain what would change if a researcher made different choices or the data changed

(9) Identify the underlying assumptions in quantitative analyses and figure out how violations affect conclusions and interpretations

(10) Read and critically evaluate analyses without being dazzled by data, methods or jargon

(11) Effectively apply course concepts to a wide range of contexts from popular press articles to papers in peer-reviewed academic journals

(12) Craft compelling, concise, precise, clear, and coherent written arguments

3 For Everyone: Accessibility, Help, and Academic Consideration

If you require accessibility accommodations, register with both Accessibility Services https://studentlife.utoronto.ca/department/accessibility-services/ and Accommodated Testing Services (ATS): https://lsm.utoronto.ca/ats/. You do *not* need to e-mail us a letter of accommodation. Contact The Information Commons Help Desk with any technical issues around Quercus, your devices, software, or technology.

For complex/challenging situations, you must ***work with your College Registrar***, in addition to following the steps in Section 12.5 for academic considerations. They give guidance and, when appropriate, contact your professors on your behalf. This requires *working closely with* your Registrar, and not merely having them restate your requests. Sometimes the only viable option is dropping our course.

4 Academic Integrity

Please do not create a horrible situation for yourself, your classmates, our TAs, and me. Even if you are stressed, scared by the marketing of disreputable "tutoring" services, and/or facing failure, cheating is not worth it. Infractions can take many, many agonizing months to resolve and sanctions can be severe. We must all work together supporting the integrity of our course and U of T. Read this link and sublinks https://www.artsci.utoronto.ca/current/academic-advising-and-support/academic-integrity.

5 Required Readings and Textbook

For our required textbook – *2020 Business Statistics, Fourth Canadian Edition* by Sharpe, De Veaux, Velleman, and Wright – you may buy:

- the eText from the U of T Bookstore for $67.99 (ISBN 9780135579343; Course ID = murdock95153),
- the print textbook from Pearson with an access code for the eText for $246.00 (ISBN 9780136726548),
- a used copy of the *Fourth Canadian Edition*. Older editions or the US / international editions are poor substitutes. However, the *Third Canadian Edition* is an acceptable substitute.

Note that "Study Prep in Pearson+" and "MyLab Statistics" are *neither* required nor recommended: we do not use this. Section 14 lists the assigned chapters. Quercus tells you each week's reading assignment. Also, be advised that our textbook highlights important points with boxes (sometimes in the margins): take the boxes seriously, including "Just Checking." Similarly, don't skip "What Can Go Wrong?"

6 Prerequisites and Workload

An administrator will remove anyone missing prerequisites. Note that I cannot waive prerequisites. You should expect to work about 8 hours per week on our course. Here's a direct quote from course evaluations: "Practice, practice, practice. Swimming in the ocean of problems really helps."

7 Required Lecture Videos and Lecture Slides

For each unit, required lecture videos and lecture slides (pdf) are on Quercus. Complete readings and lecture videos ***before*** the workshop on each unit.

8 Workshops

On Tuesdays (LEC0101 and LEC0201) or Wednesdays (LEC0301) we meet for required workshops led by Prof. Murdock where you practice a host of skills. Some Fridays are required TA led workshops to give you extra practice with the most challenging topics. Complete the unit's reading and lecture videos ***before*** your workshop. Expect to solve questions, write, and interact with your classmates and the instructional team. Bring pencils, erasers, your TCard, and the course aid sheets. You are expected to regularly attend with your ACORN section. See the Workshops page on Quercus.

9 DACM Practicums

Twelve Fridays have required DACM practicums. You learn data analysis skills, reinforce your understanding of core course curriculum, and practice effective writing skills. Bring your laptop with an up-to-date installation of Microsoft 365 ProPlus. (You will receive instructions for Stata in the Winter term.) Also, bring pencils, erasers, your TCard, and the course aid sheets. Be prepared to actively work with others, do analyses, and write. Complete the assigned readings in the DACM Handbook ahead of time. ***You must attend with your ACORN section.*** When you receive your invitation on September 17 join the DACM Quercus site https://q.utoronto.ca/courses/413963.

The skills and understanding you build via your preparation for and participation in the twelve DACM practicums are critical to your success in writing the final exam.

10 Ungraded Homework

Each unit has ungraded homework – end-of-chapter textbook exercises and required problems – and solutions on Quercus. For more on solutions to textbook exercises, see Quercus.

11 Communication with your Professor and your TAs

Our regular class meetings are our main forum for communication. We devote significant TA resources to our class meeting times to best match TA help with student availability and interest. Outside of those times, please check Quercus for Prof. Murdock's upcoming office hours, which are a great opportunity for a two-way conversation in real life. Further, in the days leading up to each term test and the final exam, our TA team offers in-person TA Aid Centres at a variety of times.

For conversations with students regarding our course (e.g. concerns with grades, remark requests, questions about content or upcoming tests/exams, excuses for missing work, and so on), Prof. Murdock does ***not*** use e-mail nor other two-way electronic modes of communication like Quercus.[1] ***Please do not expect electronic replies.*** For two-way communication, please speak to the instructional team during class meetings and/or use meet hours and TA Aid Centres.

[1]For any remark requests, see Section 12.4. For any missed work, see Section 12.5. For remarks and missed work – which are situations not resolved via a conversation – you must complete the appropriate MS Form. If you wish to send me materials regarding a letter of reference, that is acceptable. Also, College Registrars should e-mail Prof. Murdock directly. If you write to alert me about a problem in the course (e.g. a broken link), we will address it and, if needed, post an announcement.

12 Course Grades and Marking

Assessment	Weight	Estimated Date(s), Time
Term Test #1	14 %	Friday, Oct 17, 9:10am-11am
Term Test #2	14 %	Friday, Nov 28, 9:10am-11am
Term Test #3	14 %	Friday, Feb 6, 9:10am-11am
Term Test #4	14 %	Friday, Mar 27, 9:10am-11am
Participation	10 %	The *quality* of your participation matters and you must arrive on time.
DACM Practicums	6 %	Sep 26, Oct 3, Oct 10, Nov 14, Nov 21, Jan 23, Jan 30, Feb 27, Mar 6, Mar 13, Mar 20, Apr 6. Your *clearly demonstrated* effort from the start through the end matters. Attend with your ACORN section.
Final Exam	28 %	Three-hour cumulative exam. The date TBA by A&S: April 9 to 30.

12.1 Term Tests and the Final Exam

About 10 to 14 days before each test and the final exam, we post announcements on Quercus about coverage and format. Tests always cover of the most recent material: keep up with the course every week. The final exam is cumulative[2] and some questions assess your skills and understanding from DACM. The final exam is *common* across *all* sections of the course. We post many previous final exams with solutions so you can understand expectations and fully prepare for it. We give you the aid sheets at each test/exam.

12.2 Participation and DACM Practicums

Mere attendance does not earn participation marks in workshops and DACM practicums. Arrive on time and actively engage throughout. We return papers via Crowdmark. There are also some required MS Forms for participation and DACM practicums. For a missed workshop or practicum, see Section 12.5.2 for *automatic* academic considerations. Also, given the frequency of workshops and DACM practicums, we do **not** accept remark requests for these: see Section 12.5.2 if you are unhappy with a mark.

12.3 Grading of Term Tests and the Final Exam

Marks reflect any adjustments to raw scores such as adding points or not counting an unduly difficult/ confusing question. Marks, not raw scores, measure your performance. For partial credit, part of your answer must be correct, directly relevant to the question, and not contradicted elsewhere in your answer.

12.4 Remark Requests for Term Tests

For term tests, remark requests must: (1) Be submitted to Remark Request for a Term Test, which is an MS form, (2) Explain WHY more points are justified, (3) Be submitted within TWO WEEKS of the test's return to the class. Your mark may remain unchanged, go up, or go down. These are given a fair look: TAs are *not* seeking to penalize those with genuine marking concerns. Requests are reviewed *after* the two-week deadline, not immediately. We will *not* consider any remark requests after the deadline. Note that there is no "reply" to remark requests: after they are processed, any changes will automatically appear on your Crowdmark paper. (The most common result is no change.)

[2] Why have a *cumulative* final exam? Pedagogically, revisiting earlier material aids learning and long-term retention of skills. Practically, it allows the final to have a higher weight and be an opportunity to rebound.

12.5 Academic Considerations

You are expected to regularly attend classes and write all tests. This section explains academic considerations for: illness, injury, personal/family problems, religious reasons, extracurricular conflicts, joining the course late, travel issues, and/or any challenge beyond your control. ***For significant challenges, work with your College Registrar immediately***, *and* follow the steps below.

12.5.1 Missed Term Test

For any missed term test, complete BOTH of these steps. (If you are just late, show up late to the test.)

First Step: Complete Missed Term Test, which is an MS form. We expect the MS form to be submitted *BEFORE* the missed test. In life it is unacceptable to fail to show up for an important engagement without advance notice. We do NOT wish to see documents from medical professionals.[3]

Second Step: Check your U of T e-mail for information about the make-up test. The e-mail may arrive up to three business days *after* the date of the missed test. No information about the make-up test is available earlier: it must be arranged after we know everyone who will write it and deal with any ACORN conflicts for its date and time. You are expected to be available both during the term and during the exam periods. Make-up tests are restricted and do not appear in Crowdmark. For feedback you may write the regular test, on your own, and mark yourself with the posted solutions.

For extensive missed work – some examples: missing weeks of classes and then a term test; or missing Test #1 and Test #2 (two in a row); or missing a make-up test – you must take the steps above *and* immediately work with your College Registrar who may contact us on your behalf if they recommend academic consideration. They require documentation. Unless we are contacted directly by a College Registrar in a timely manner, extensive missed work means many marks of zero.

12.5.2 Automatic Academic Consideration for Workshops and DACM Practicums

In case you miss, arrive late, or have any problems for reasons beyond your control, we automatically drop the lowest four workshops. For DACM practicums, we automatically drop the lowest two. (Note: If you work with your College Registrar because of extensive missed work, documentation is required for *all* missed classes.) The automatic academic considerations are for situations *entirely outside your control*: do not miss for any potentially avoidable reasons. These are not "get out of class free" cards. These academic considerations are *automatic*: please do *not* contact us about missing a workshop or practicum.

12.5.3 Automatic Adjusted Weights for Relatively Poor Test or Exam Performance

Automatic adjusted weights may help if your performance is relatively poor for one test or the final exam. If it helps your course grade, we automatically lower the weight of your lowest test by 9 percentage points and increase the weight of the final exam by 9 percentage points. Conversely, if *every* one of your four term test marks is higher than your final exam mark (which is not 0), we automatically decrease the weight of the exam by 6 percentage points and increase the weight of each term test by 1.5 percentage points. Any questions around your academic integrity for *any* work disqualify you from automatic adjusted weights.

[3] This allows you to submit the MS Form *before* the test and recognizes that our healthcare system is strained.

13 Advice for Your Success

For additional supports beyond those embedded in our course, visit the Economics Study Centre. Work with old tests in test-like conditions. If you cannot solve a question, turn to your notes and course materials. Only as a *last resort*, ask a person or look at the solutions. Use solutions to *grade* your own answers.

14 Topics and Required Readings

Required readings include our textbook and supplements created for our course (marked in boldface below and available on Quercus). Chapter numbers reference our textbook and any exclusions are noted. We finish through Chapter 11 in the Fall term and the rest in the Winter term.

- ***Prerequisite Review for ECO220Y1Y, 2025/26*** pages 1 - 42
- 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*
- ***The DACM Handbook for ECO220Y1Y, 2025/26*** pages 1 - 182
- Chapter 6: *Scatterplots, Association, and Correlation*
- SW11: Chapter 1, *Economic Questions and Data* pp. 1 - 13 from *Introduction to Econometrics, Third Ed.*, 2011, by James H. Stock and Mark W. Watson
- Chapter 7: *Introduction to Linear Regression*
- ***Logarithms in Regression Analysis with Asiaphoria for ECO220Y1Y, 2025/26*** pages 1 - 27
- Chapter 8: *Randomness and Probability*
- Chapter 9: *Random Variables and Probability Distributions* (Excluding Sections 9.7 *The Poisson Distribution*, 9.12 *The Exponential Distribution*, and "Normal Probability Plots" pp. 280-2)
- ***Normal Table: Read it, Use it for ECO220Y1Y, 2025/26*** pages 1 - 14
- 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* (Excluding "How does the Normal probability plot work?" pp. 607-8)
- Chapter 19: *Understanding Regression Residuals*
- Chapter 20: *Multiple Regression*
- Chapter 21: *Building Multiple Regression Models* emphasizing Sections 21.1 *Indicator (or Dummy) Variables*, 21.2 *Adjusting for Different Slopes – Interaction Terms*, and *Quadratics* (online) (Excluding "Residuals and Standardized Residuals" and "Influence Measures" pp. 737-9)

Also, an optional (and recommended) reading, is "Belief in the Law of Small Numbers" by Amos Tversky and Daniel Kahneman published in 1971 in *Psychological Bulletin* (**TK71**).[4]

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