ECO375: APPLIED ECONOMETRICS, FALL 2024
DEPT. OF ECONOMICS, UNIVERSITY OF TORONTO
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COURSE OUTLINE

This course outline will help you learn more about ECO375, a course in Applied Econometrics. Below you will find a description of the course, a reading list, a description of our typical weekly schedule, a checklist of start-up requirements, a list of topics covered, and course assessment break down. This information can help you assess whether the course is a good fit for your goals and schedule. If you are interested in the detailed course syllabus – a required read if you are taking the course – please go to the course website and toggle to the "Course Syllabus" page: https://q.utoronto.ca/courses/357755.

1 COURSE DESCRIPTION

Overview:

This course is an introduction to the statistical analysis of economic relationships and has a dual focus on theoretical foundations and the application of empirical techniques using economic data. Econometric methods will be illustrated using the application of regression techniques to a wide variety of economic questions and data sources, and you will learn to use statistical software to analyse these data. A centrepiece of the course is the course project, which will train the following skills:

- testing the **feasibility** your econometrics ideas,
- developing an idea for **formal analysis**,
- reporting on your analysis through **oral summary**,
- communicating the details of your analysis in **written form**, and
- creating a **replication package** containing your data and code

By the conclusion of the course, you should have a solid theoretical and practical foundation for the investigation, interpretation, and communication of empirical evidence in economics.

Reference materials: Required readings will be assigned each week, supplementing the weekly reference resources and lecture notes. Throughout the course, we will consistently consult the required textbook listed below, which is accessible through UofT libraries and available for purchase in the UofT Bookstore or elsewhere. Other readings will be posted directly on our website on our weekly content page. You may also find it useful to consult other econometrics or statistics books. This is especially useful if you are already familiar with these books through other courses (i.e., this will help you build a bridge from your previous courses to our course material).

Required Textbook:

- Introduction to Econometrics, 4th Edition by James H. Stock and Mark W. Watson.

Other References (not required):

- Introductory Econometrics: A Modern Approach, 7th Edition by Jeffrey M. Wooldridge.
- Mastering 'Metrics by Joshua Angrist and Jörn-Steffen Pischke (Princeton University Press, ISBN:978-0-691-15284-4)
- Causal Inference: The Mixtape by Scott Cunningham (https://mixtape.scunning.com/)
- 2020 Business Statistics, Fourth Canadian Edition by Sharpe, De Veaux, Velleman, and Wright

Software: Throughout our course we will learn to use statistical software in lectures and tutorials. This will provide lots of practice using software, which you will apply to your own project. Specifically, we will use the software, Stata, which is one of the easiest statistical packages to gain quick proficiency in basic data and regression analysis. We do this because the process of "applying econometrics" can be daunting, and so we will simplify the *logistics* of doing analysis by using the same common language across all elements of the course and within the course community. *Can you use another program?* No. There is value in "speaking the same language" in our course activities, whatever that language may be. Stata is the primary statistical package supported by the instructor and TAs and will be used by your classmates. While it is technically possible to use another software program, you would need to be proficient enough to translate Stata references/tasks directly into another package all the while staying in time with course activities, and you would need to translate all of your analytical code back into Stata for submission on the course project. Remember also, that many students in the course will have no background in any statistical package, so by setting out as a beginner Stata user, you are not starting out behind but rather adding another program to the list of software to which you've become familiar.

Stata is available at reduced rates through the student pricing program, which allows U of T students to buy Stata software at low prices from StataCorp directly. The 6-month subscription to Stata/BE is sufficient for our needs: student page linked here (toggle to the 6-month tab for reduced pricing): https://www.stata.com/order/new/edu/profplus/student-pricing/. Stata is also available for free in the library computer lab: https://mdl.library.utoronto.ca/technology/statistical-software.

2 COURSE LOGISTICS:

Course website: https://q.utoronto.ca/courses/357755

Course email: eco375.ward@utoronto.ca

Office hours: multiple times per week; see Quercus for times and locations (listed under Quick Links)

Course schedule: ECO375 has a scheduled meeting time of Thursdays 9am-11am, and section meeting times of Fridays 9am-11am (section L0101), 11am-1pm (section L0201), and 1pm-3pm (section L0301). We assume students are available each week at the times given for their section on the university timetable, and we expect weekly attendance as the course involves participation-based work within our scheduled course time slots. For a full description of the

weekly schedule, please see the section on Course Meetings.

Communication: Most points of communication for the course (lecture, tutorial office hours, help desk, email) are detailed through the course website (address given above). We coordinate course help, project support, and office hours to course timeslots to avoid other scheduling conflicts and to streamline discussions about course content. Please see the Course website for details on how best to communicate with course staff depending on your type of inquiry.

Preparation and Prerequisites: ECO375 is a 3rd-year course in Applied Econometrics, which builds directly on second-year prerequisites, particularly ECO220Y1 (Introduction to Data Analysis and Applied Econometrics) or its equivalents ECO227Y1/ (STA237H1, STA238H1)/ (STA247H1, STA248H1)/ (STA257H1, STA261H1). Our starting point will assume mastery of prerequisite material, and we will spend the first weeks of the course bringing your accrued second-year statistical knowledge to the practice of applied econometrics. The rest of the course builds on that knowledge with the subsequent, more advanced course topics. It is your responsibility to bring sufficient comprehension of prerequisite material, and it is the responsibility of our course to build on that baseline. We view prerequisites not only as a thing you did that one time, but as necessary preparation for ECO375. The full set of prerequisites for ECO375 are listed and described here: https://artsci.calendar.utoronto.ca/course/eco375h1. Note: the department checks whether students have the correct course prerequisites and will automatically remove those who have not fulfilled the requirements.

3 WEEKLY SCHEDULE

Our course structure in a typical week begins with readings and reference content (required), and it ends with interactive lectures, assessment activities and problem-based tutorials, which integrate the week's knowledge and assesses your understanding. All material for the week will be posted on the course calendar according to date. Specifically, readings and resources will be followed by the **Thursday Tutorial (**in-person) and **Friday Lecture** (in person). Additionally, each week also includes open office hours on Thursdays and Friday.

Weekly details will be announced and posted ahead of time on the weekly calendar on Quercus. As noted in Section 1, you should expect to be available for all four hours of course time each week (this ensures that you are ready to attend all weekly participation components and guarantees that you have no conflicts in reaching out for help during office hours). Note also that the above provides an example of a *typical* week, which will occur with modification around midterm dates, assessment components, and unforeseen events.

3.1 SKILL-BASED WORKSHOPS

There are scheduled workshops throughout the semester to assist you in developing and polishing each phase of the ECO375 course project. Specifically, on select weeks, we run Stata workshops to provide support in manipulating and analysing data using Stata. On select Fridays (e.g., prior to project phase submission deadlines), we run Project Workshops, which provide targeted support for project development through self-editing techniques and peer feedback.

3.2 KEEPING UP A WEEKLY PRACTICE

Keeping a regular practice of course skills is particularly important in ECO375 as the content builds on itself, and your mastery of it depends heavily on spaced repetition. To this end, our econometric training schedule will involve a weekly practice of study, application and reflection, which we then use as the basis for the next week's training. There is a cadence here, where each week adds to last week's progress, and we build our understanding by using our weekly training regime: study, apply, reflect. Just as you would not expect to run a successful marathon by leaving all training to the night before the race, you cannot expect success in this course by leaving all course work to the night before due dates. To put an even finer point on it, if you do not prepare yourself with weekly readings and resources, you will be at a significant disadvantage in completing the weekly activities and participation components. This accumulated deficit will, in turn, handicap your performance in larger course components like the final course project and test.

3.3 MEETING PARTICIPATION

Aside from expecting you to prepare each week, we expect your weekly attendance and participation in course meetings (i.e., lectures, tutorials, Project workshops, Stata workshops). While we provide online access to course materials (lecture slides, code files, data sets, and reference materials), these materials are an ingredient to (not a substitute for) your active participation in weekly meetings. Moreover, weekly meetings provide specific context for the material and are productive to completing the course assessments. The lectures, for example, include group activities, which have direct application to your submitted course work, and the Stata workshops and weekly tutorials develop skills that ready you for the project phases and tests. Several of these course meetings will also include assessment of active participation on your part (see the Evaluation section below). Do not get in the habit of missing weekly meetings.

3.4 FRIDAY LECTURES

Friday lectures are live and delivered in-person. Please prepare ahead of time by reviewing the week's lecture material, which will make it significantly easier for you to engage with the live lecture content (and with the rest of the ECO375 community).

During the lecture period, you will want to ensure you have some way to access our Quercus site for course materials (via wifi with, preferably, a laptop), and you will also need some way to take notes (electronic annotation, paper and pencil, or alternative). Taking notes will be particularly important since not all information is contained on the posted lecture slides. You can take notes any way you prefer, e.g., you can do it on physical paper referencing slide numbers …or you can do it electronically directly on posted lecture slides, etc. You get the idea here: taking notes is important, and you need to find a way to do it.

Access to Stata during lectures is recommended since lectures often include live Stata examples (and since the Friday meeting is an opportunity to check in with me or classmates on code issues you may be up against).

3.5 THURSDAY TIMESLOT

Tutorials are live and delivered in-person. You should prepare for the tutorial ahead of time by preparing the assigned weekly material. Like the lecture, you will need a way to take notes, and

you will need access to the course Quercus site (via wifi with, preferably, a laptop). Again, access to Stata during tutorials is recommended since tutorials often include live Stata examples (and since the Thursday meeting is yet another opportunity to check in with TAs or classmates on code issues you may be up against). An alternative to having direct access to Stata during the workshop is to share with a neighbour, take notes on process, and then replicate the exercises in Stata later at home or in the computer lab.

We expect you to regularly attend tutorials and to participate. Is there an incentive to go to tutorials? Yes, my friends, because this is where you will find solutions to tutorial problems. In other words, we will not be posting solutions to tutorial problems online. The aim here is for you challenge yourself with the weekly problems and then take up the questions together with your tutorial group. If you need help outside this, at any time, follow up with us on Thursday Help Desk or come to the Friday office hours.

Help Desk: During the last half hour in our Thursday time slot, we will be running an ECO375 help desk. The help desk is staffed by the ECO375 team for most weeks of the semester. Aside from being staffed by one of our team, it also provides a dedicated place on campus to work on ECO375 material. This makes it a great place to meet up with your project partner or with your other peers (who are also working on econometrics projects!).

4 Checklist of Requirements for Course Delivery

Start-up tasks:

- **Check** you have course prerequisites: https://artsci.calendar.utoronto.ca/course/eco375h1
- **Review** your methods prerequisites by digging up your textbook/course notes and jogging your memory of the main topics covered therein. The methods prerequisite is ECO220Y1 (Introduction to Data Analysis and Applied Econometrics) or its equivalents ECO227Y1/ (STA237H1, STA238H1)/ (STA247H1, STA248H1)/ (STA257H1, STA261H1).

For in-person meetings, you will need:

- **Paper and a pencil** (and probably an eraser, unless you're the kind of person that never makes mistakes). Electronic equivalents will work as well.
- Access to a **reliable laptop** with wifi capabilities and ability to access a web browser and our Quercus materials. You will need to bring this laptop to lecture and tutorial time slots (be they in-person or online). See Weekly Details section for details.
- An **installation of Stata** on your laptop, which can be accessed during course time slots (be they in-person or online). See Course Description section for details.
- The **course textbook**. See Course Description section for details.
- A current **installation of Office 365**, available at no cost to current U of T students, via the page Office 365 ProPlus: https://uthrprod.service-now.com/infocomm?id=kb_article&sys_id=514599cf47d011d0c36312c2e36d4378
- Your **TCard** (your U of T Student ID card) ready

- If you have an accessibility concern, reach out to ATS for accommodation as soon as possible so that we can get to work on things right away. To do this visit http://www.studentlife.utoronto.ca and register with Accommodated Testing Services (ATS): https://studentlife.utoronto.ca/department/accessibility-services/

FOR ONLINE MEETINGS:

- Regular access to a **reliable laptop** with a working microphone and webcam
- A **Zoom account under your U of T credentials** (personal Zoom accounts are blocked from accessing U of T zoom sessions).
- Regular access to **reliable high-speed internet** and **reliable electricity**
- The **hardware, software, and knowledge to scan your work to be uploaded**. Most phones can scan (a separate scanner is unnecessary) to create PDF, JPG, or PNG files.

BEST PRACTICES:

- Regularly follow our **Quercus site for detailed guidance**, updated as our situation evolves.
- Be **proactive to avoid technical and other difficulties**, which includes submitting well before deadlines, maintaining your devices, keeping software up to date, minimizing the strains on your internet bandwidth, learning how to scan efficiently, carefully reading all assessment instructions, and contacting your instructor/TAs immediately with any problems.

5 COURSE COVERAGE

Topic*		Reference
Intro:	Introduction to the Practice of Econometrics	Chapter 1; notes; videos
	Introduction to Stata	Stata Primer; notes; videos
Bridging:	Bridging from 2nd Year	2yr Pre-req Chapter Review**; Chapter 2-3
Topic 1:	Review of probability and statistics	Chapter 2-3; notes; videos
Topic 2:	How to conduct an econometric study	Reading: "Conducting an empirical analysis"
Topic 3:	Simple Linear Regression : Estimation and Inference	Chapter 4-5, 17; notes; videos
Topic 4:	Multiple Linear Regression : Estimation and Inference	Chapter 6-7; notes; videos
Topic 5	Nonlinear Regression Functions	Chapter 8; notes; videos
Topic 6:	Assesssing Studies based on Multiple Regression	Chapter 9; notes; videos
Topic 7:	Panel Data Models	Chapter 10; notes; videos
Recap:	Conclude and Recap	

*Note: topics may be covered in less than or more than a week depending on our pace as we move through the course.

** Review your methods prerequisites: ECO220Y1 or its equivalents ECO227Y1/ (STA237H1, STA238H1)/ (STA247H1, STA248H1)/ (STA257H1, STA261H1). You can do this by reviewing your prior textbook and course notes to jog your memory of the main topics covered therein.

6 COURSE ASSESSMENT

6.1 EVALUATION

The overall course grade in ECO375 will be determined as follows:

Assessment	Weight	Due Date	Collaborators	Submission
Participation Week 1	**1%**	06-Sep	None	In class (individually)
Participation Week 2	**1%**	12-Sep	None	In class (individually)
Data Analytics Module 1	**2%**	18-Sep	None	Online (individually)
Data Analytics Module 2	**2%**	19-Sep	None	In class (individually)
Course Project[1]			Limited[2]	
Phase 1: Ideas Workshop[3]	1%	27-Sep	Peers in-class	In class (individually)
Phase 2: Feasibility Plan	10%	18-Oct	Partner	Online (as pair)
Phase 3: Class Presentation[3]	1%	25-Oct	Peers in-class	In class (individually)
Phase 4: Presentation Video	15%	08-Nov	Partner	Online (individually)
Phase 5: First Draft	1%	21,22-Nov	Partner	Online and in class; See note[4]
Phase 6: Editorial Assessment: Self/Peer[3]	1%	29-Nov	Peers in-class	In class (individually); See note[5]
Final Project Submission[6]	40%	05-Dec	Partner	Online (as pair)
Term Test	**25%**	28-Nov	None	In class (individually)

[1] The weight for each phase gives the percent contribution of each phase to the total course grade.

[2] The course project is completed in pairs, and you will collaborate with your partner through the process. Additionally, limited discussion and interaction regarding the project permitted with other classroom peers. See description of limits in the section below. Note that any marks for peer work are given for your completion of a peer review and not based on feedback from your

[3] Phases 1, 3, 5, and 6 are completed in conjunction with in-class workshop activities (the Project Workshops). These workshop activities are required and completed individually (i.e., even if you are working in a pair on the project, your workshop submissions are individual). See details below.

[4] The written paper is due on Nov 21st, which is submitted online as a solo or co-authored (i.e., partnered) paper. On Nov 22nd, each student will attend their enrolled lecture section and bring a hard copy of their paper (e.g., paired students bring two copies of their co-authored paper). Activities will be submitted in-class individually. See further details below.

5 On Nov 29th, each student will attend their enrolled lecture section and bring a hard copy of a peer's paper. Activities will be submitted in-class individually. See further details below.

[6] Evaluation of the Final Project will include our assessment of the replication package and final draft of your written paper and of your own assessment of progress through the project using your phase submissions as supporting evidence.

6.2 COURSE PROJECT

The course project allows for substantial creativity beyond what is possible during timed assessments, and it provides the opportunity to develop your econometric skills in programming, data manipulation, statistical analysis, and interpretation of results. Through this process you will also learn to feasibility-test your econometric ideas and hone your presentation and writing skills (all while you gain a deeper knowledge of a topic of specific interest to you).

Process-based phases: the course project is process-based and developed over six phases. This means most of your learning will be spaced throughout the semester with low-stakes assessment providing a guide towards your project's continued development. There is ample opportunity for "mistakes" along the way (e.g., choosing an impractical idea, estimating the wrong model, misinterpreting results, etc.), but identifying and adjusting for mistakes will be part of your process in this course. Give a lot of love to these mistakes because this is where the learning lives.

Unique Projects in groups of two: the course project is designed as a paired project, and we strongly recommend working with a partner. It is possible to work solo, but we do not allow groups of more than two. The final submitted project must be based on a unique idea/dataset for each group (be it solo or pair). This means no two projects will be the same. Put another way, the only context where you can work on the same project as someone else is if you are formally paired up on the same project.

Break-ups and Marriages: in situations of acrimony, pairs can break-up and go solo. However, in such cases, the break-up must occur before Phase 4, and at least one of you must start again with a new unique idea/dataset in advance of the Phase 4 deadline. This is because "going solo" requires your solo project to be unique from all others from Phase 4 onward. Similarly, two (initially) solo students can partner up as a pair at any time before the Phase 4 deadline and submit to the remaining phases as a pair. Note that in all cases, once a pair submits to the Phase 4 deadline with a partner, you are effectively "married" for the rest of the project (for better or worse, until final submission do you part).

Project Workshops: Phase 1, 3, 5, and 6 are completed in conjunction with in-class workshop activities (aka, the Project Workshops). These workshop activities are required and are completed individually. This means that even if you are working in a pair on the project, your workshop submissions are completed and submitted individually. For instance, during the Ideas Workshop (phase 1), you will complete and submit individual work separately from your partner. Similarly, in the Class Presentation workshop (phase 3), both of you will present your joint work separately, with each partner presenting to a different group of peers. Lastly, in the Written Paper stage (phase 5 and 6), both of you will bring your own copy of your joint paper to edit and share separately with a different peer. If you are not paired, then, of course, you are doing all the project phases alone.

Submission: A summary and schedule of the project phases is given in the Evaluation section above, and detailed instructions and expectations will be posted on Quercus. Note that these expectations include in-person attendance in Project Workshops on key weeks of the course. Submission of work product will occur according to the instructions on Quercus and on the schedule listed above. For your convenience, all assessment dates are highlighted in green on the course calendar according to when they are due. You must manage your time: you assume all risk of working on these in the final days before deadlines. Workshop deliverables must be ready/completed by the start of the workshop period, and you are expected to arrive on time. Online submission is expected by the deadline and clocks are set accordingly. Any deadline associated with a workshop is strict and students must attend in their section. For all other project due dates, there is a short grace period of 2-hours after the deadline, but beyond that we do not accept late submissions. There are no make-ups and no extensions for any reason.