

Econ 266: Introduction to Econometrics

Hamilton College
Spring, 2022

SYLLABUS

TIME & LOCATION

Lectures on **Tuesdays** and **Thursdays** 9:00-10:15 AM (Sections 1 & 2) in *KJ-Aud*

Labs on **Wednesdays** 1:00-2:15 PM (Section 1) and 2:30-3:45 PM (Section 2) *KJ-202*

INSTRUCTOR

Mo Alloush [He/Him/His]

mismaila@hamilton.edu or malloush@hamilton.edu

Office Location: KJ-218

Office Hours: Tuesdays 2-4 PM; Wednesdays 10-11:30 AM

If you cannot make it during these times, email me and we can schedule an appointment.

ADDITIONAL ASSISTANCE

Jenn Fleming, *Student Teaching Assistant*

James Argo, *Student Teaching Assistant*

Ahra Wu, LITS Data Specialist, Zoom Office Hours by appointment (See Blackboard)

COURSE DESCRIPTION

Course Description: Econometrics uses statistical techniques to answer questions in Economics and other social sciences. In this course we will emphasize *empirical methods*. You will get an introduction to different techniques used to analyze data to answer policy relevant research questions. You will learn when it is appropriate to apply econometric tools and understand the underlying assumptions made. Successful students will become proficient with a statistical package, **Stata**, and will be able to formulate and critically assess empirical research questions. By the end of the course, students will be able to identify what assumptions are required to interpret econometric evidence as causal and clearly state the potential sources of bias. Students will be able to formulate statistical tests and interpret the results in the broader context of economic models and policy.

Course Objectives and Goals: This course fulfills several of Hamilton's educational goals, including: specifically *disciplinary practice*—you will become familiar with, and learn to use, the empirical tools of economists. The course will also increase your *analytic discernment*. By discussing the empirical models and what they do and do not teach us, you will learn to critically assess evidence and answer important policy-relevant questions.

Prerequisites: The course formally requires that you have taken Econ 166.

Textbook: The required textbook for this course is ***Real Econometrics*** by Michael Bailey. In addition, ***Mastering Metrics: The Path from Cause to Effect*** by Angrist and Pischke is a good supplementary textbook. I will also assign readings (and video lectures) from free online sources that you can access through blackboard.

COURSE FORMAT

A weekly course outline begins on Page 6. Learning any material well requires active engagement. I would like you to view me as a facilitator of your learning process: In class, I will explain new concepts, discuss important points, and add context to the assigned material. Importantly, I want you to view the class as an ongoing informed and engaged discussion with me and your classmates.

Familiarize yourself with the information in the assigned readings *prior* to class. Engagement with the material during class will reinforce your learning. If something is unclear or you need additional help, please ask, in lecture, labs, or my office hours.

This course is a 15-week semester-long course yet it will move at an accelerated pace. It is important to keep up with the readings and materials. The assignments, labs, participation grade, midterms, papers, and final are all designed to incentivize and reinforce your learning.

In-class engagement is critical to learning. I will frequently ask questions and encourage students to answer them. Active discussion will be a normal part of classroom lectures. If you'd like to participate in class, you can do so by: (1) raising your hand or (2) checking your phone.

Blackboard: You will access course materials, readings, and other information via the course Blackboard website. Visit the site often. I will use Blackboard to record your grades in the class. It is your responsibility to verify that these scores are properly recorded.

Gradescope: We will be using Gradescope for submitting your assignments, midterms, and final. Make sure to register and sign up for this class. Make sure you know how to use this feature. You may download apps (see https://cs.stanford.edu/~ermon/cs228/submitting_hw_guide.pdf) to your phone that will allow you to easily create pdfs to upload your written material. You should also learn to use the equation editor on Microsoft Word or google docs.

Grading: Your grade in this course will be based on total points earned and weighted as follows:

Attendance, Engagement, & Participation	3%
Problem Sets (6)	14%
Lab	
<i>Papers (3)</i>	12%
<i>Submitted workflow</i>	6%
Exams (2)	
Higher score	23%
Lower score	17%
Empirical Project	
<i>Proposal</i>	1%
<i>Presentation</i>	7%
<i>Paper</i>	10%
<i>Oral Exam—individual</i>	7%

Participation: I expect you **to attend all classes**. When in class, I expect you do contribute to the discussion, answer my questions, and ask informed ones. My goal for you is to become truly engaged with this material, and I will give you credit for steps you take to demonstrate your engagement. The most important factors in determining your engagement grade (in decreasing order) will be 1) your regular attendance 2) your participation and engagement during labs, and 3) your participation during lectures. Completing the syllabus quiz (on Gradescope) successfully before the second day of class will give you a 1% automatically. I will also give you credit for other outside-of-class demonstrations of engagement in course material that you make at your own initiative.

Problem Sets: You will complete six problem sets assignments. The main purpose of these assignments is to help you practice applications of important concepts.

Some of the questions will be straightforward but most of the problem set questions will require you to apply multiple concepts in a single problem, making them inherently more difficult. I consider these assignments as an *extension of my teaching* and will allow you to better understand the material. Trying to solve the problems is an important part of your learning. Seeking my help during office hours is a productive way to enhance your understanding of these concepts. You may discuss work on any of these problems with your classmates, but please be aware that simply copying the work of others without understanding will not prepare you for the exams. *Your lowest problem set score will count as 0.6 of each of the other 5.*

Labs: Over the course of the semester, we will have labs every Wednesday. We will work with different datasets and for most labs you will be required to answer a few questions on Gradescope. Three time during the semester, you will write lab **papers** that ask you to apply the econometrics concepts you have learned to study a question of interest to economists. You will use Stata to complete these assignments. An extra Stata session will be offered in the first week of classes for those who are not familiar with Stata. You should consult LITS data specialist *Ahra Wu* or your TAs for your Stata needs. *Plus, carefully searching for answers to your Stata questions online will almost always lead you to an answer.*

The labs require you to perform your own calculations. Make sure you learn how to use Stata properly. It is not acceptable to use computer output generated by somebody else as part of an answer to a question on a lab report. **This is a serious violation of the Honor Code and will be treated accordingly.**

Empirical Project: In the last few weeks of the semester you will work in groups of two on an empirical project using data and the methods you learn throughout the semester to answer a research question of your choosing. More details on this project can be found on Blackboard. For this project you will submit an early proposal (describing your idea and the data you will use), present your results, and write a 10 page paper. After submitting your paper, I will conduct one on one oral exams where we discuss your paper and relate it to concepts you learned throughout the semester.

ADVICE

Throughout my experience, I have found that a lot of students find the material in this course difficult at first. That's OK! You will learn a lot and the skills you learn in this class may be extremely valuable for your academic and professional success in the future. Given this, here are a few pieces of advice about how you should approach this class:

- Homework and Labs are the best practice for exams; I encourage you to always try hard to solve them and resolve your problems on your own before you consult others.
- A major goal of this class is for you to be comfortable with data analysis using Stata (the statistical software package popular among economists). You will need it in future economics classes and likely your senior thesis so make it a priority to learn it.
- We will be covering a lot of material which builds on itself, in a short period of time, thus it is important that you review your notes after each class, making sure that you understand the material, and trying again, on your own, to solve the problems done in class.
- The best time to talk to me outside of class is during my scheduled office hours. Even if you do not have specific questions about the class material, come by during office hours. We can talk about your progress in the class, future economics courses or any other questions you might have. If you need more time or cannot come during my scheduled office hours, please make an appointment with me. You can also email me with quick questions, I will respond as soon as I can.

COURSE POLICIES

Late Work: Over the course of the semester, you will turn in several assignments (problem sets and lab workflows and papers). Each student is allowed **one** two-day grace period to be used over the course of the semester when circumstances make it difficult to turn in an assignment on time. This will allow you to turn in one assignment as late as 48 hours after it is due without penalty. ***This option cannot be exercised on exams.***

Once you have exercised this option, you will be penalized 10 percentage points on your assignment for every 12 hour interval that the work is late—once an answer key is uploaded to Blackboard (usually 48-72 hours after due date), I will not accept assignments anymore. You have a 10 minute grace period for technical difficulties. If I indicate an assignment is due at 8:00 PM, if you submit anytime between 8:11 PM and 8:10 AM, you will be penalized 10 points. If you submit between 8:11 AM and 8:10 PM, the penalty will be 20 points...

Staying in Touch: Please check your e-mail frequently. Over the course of the semester, I will send e-mails about course material and assignments. In addition, course assignments are posted on the course's Blackboard page. Should you miss a class **for any reason**, you are responsible for checking this page for any new assignments posted and turning in that assignment on the scheduled due date.

Regrade Policy: All requests must be submitted within one week of receiving the grade back in the form of your original work and a written explanation of why you believe your assignment/exam should be regraded. If you submit a regrade request, **your whole exam/problem set will be subject to regrade.**

COURSE MISCELLANEOUS

Code of Academic Conduct: Students are expected to understand and abide by the Hamilton College Honor Code (<https://www.hamilton.edu/student-handbook/studentconduct/honor-code>). Any violations of this Code will be treated seriously.

You are expected to do your **own academic work**: failing to do so is **scholastic dishonesty**. Scholastic dishonesty includes cheating on examinations or assignments; copying assignments from old answer keys; engaging in unauthorized collaboration on academic work; plagiarizing; taking, acquiring, or using test materials without faculty permission; falsifying records to dishonestly obtain grades; fabricating or falsifying data or data analysis results.

If you have additional questions about what would constitute scholastic dishonesty in the context of this class, please ask me.

Disabilities: Hamilton College will make reasonable accommodations for students with properly documented disabilities. If you have a learning or a physical disability that requires accommodation, please meet with me during the first two weeks of class. All discussions will remain confidential. You will need to contact Allen Harrison in the Dean of Students Office (Elihu Root House; ext 4021) who coordinates services for students with disabilities.

Inclusive Classroom: Hamilton College is a diverse community comprised of individuals having many perspectives and identities. In order to create an inclusive and intellectually vibrant community, we must understand and value individual differences and common ground. The Hamilton College Guiding Principles (<https://www.hamilton.edu/student-handbook/studentconduct>) reflect the ideals I seek to uphold in this class.

It is my goal to foster an inclusive learning environment that supports a diversity of thought, experience, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.).

All people have the right to be addressed and referred to in accordance with their personal identity. If you have a name and/or set of pronouns that differ from your official Hamilton records, please let me know. Also, I, like many, am still learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please come talk to me about it.

Courtesy: As a courtesy to your fellow students and me, be respectful. Be on time for class. If you arrive late or leave early, please do so quietly. Do not use your cell phones, tablets, or laptops during lecture other than for class purposes. You may not take pictures of my notes or otherwise take recordings during class—I expect and encourage you to write down your own notes.

Mental Health & Stress Management: Especially in these unusual times living through a global pandemic, as a student you may experience a range of issues that can cause barriers to learning. This includes strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. The source of symptoms might be strictly related to your course work; if so, please speak with me.

If at any time you feel overwhelmed, anxious, depressed, or in danger of harming yourself or others, please reach out for support. It is important to know that Hamilton College community cares and has services that are available to assist you. Campus Safety (315-859-4000) or the Counseling Center (315-859-4340 option 2) has people available 24/7. You can also contact: Associate Dean of Students, Lorna Chase (315-859-4600), Associate Dean of Students, Tara McKee (315-859-4600), your faculty advisor, your RA, or Area Director in your residence hall.

Learn more about the broad range of confidential psychological care services available on campus via the Hamilton College Counseling Center website. The College provides confidential and free psychological services to help you manage personal challenges that may threaten your well-being.

In the event that I suspect you need additional support, I will express my concerns and the reasons for them to you, and remind you of resources that might be helpful to you.

Getting help is a smart, often difficult, and always courageous thing to do.

COURSE SCHEDULE

This sketch of topics, readings and assignments may change slightly as we proceed. Readings are from the Bailey textbook unless otherwise specified. Readings not in the textbook are available on the course website.

Week Starting	Topics	Resources
1 02/01	<i>Introduction & Review</i>	Chapter 1 & Appendix pages 538-555 <i>Mandatory Stata Workshop</i>
Module 1: Basic Regressions		
2 02/08	<i>Simple Linear Regression (OLS)</i> <i>Lab: Good Data Practices (ACS)</i>	Chapters 2 and 3 <i>Problem Set 1</i>
3 02/15	<i>Simple Regression (continued)</i> <i>Lab: South Africa</i>	Chapter 3 & 14 <i>Lab write-up 1</i>
4 02/22	<i>Hypothesis Testing</i> <i>Lab: GDP</i>	Chapter 4 <i>Problem Set 2</i>
5 03/01	<i>Causality, Potential Outcomes, & Sources of Bias</i> <i>NO LAB WEDNESDAY: Wellness</i>	
Module 2: Regressions (Upping your regression game)		
6 03/08	Exam 1 (03/09 at 5:00 PM) <i>Lab: RCT</i> <i>Multivariate OLS</i>	Chapter 5 & 14
7 03/15	<i>Dummy variables & Model Specification</i> <i>Lab: TBD</i>	Chapter 6 & 7 <i>Problem Set 3</i>
8 03/22	<i>Dummy Dependents & Panel Data</i> <i>Lab: TBD</i>	Chapter 12 <i>Lab write-up 2</i>
9 03/29	<i>Fixed Effects & Difference-in-Differences</i> <i>Lab: TBD</i>	Chapter 8 <i>Problem Set 4</i>
Module 3: How do we really use this stuff?		
10 04/05	<i>Instrumental Variables</i> <i>Lab: Instrumental variable application</i>	Chapter 9 <i>Lab write-up 3</i>
11 04/12	<i>Advanced RCTs & Regression Discontinuity</i> <i>Lab: Empirical Project IDEAS</i>	Chapter 10 & 11 <i>Problem Set 5</i>
12 04/19	<i>Time Series</i> <i>Lab: Time Series</i>	Chapter 13 <i>Project Proposal</i>
13 04/26	Exam 2 (04/26 at 5:00 PM) <i>Time Series (Continued)</i> <i>Lab: Empirical Project Appointments</i>	Chapter 13
14 05/03	Empirical Paper Presentations	 <i>Problem Set 6</i>
15 05/10	Empirical Paper due on Tuesday 05/11 Oral Exams (by appointment)	