

ECON 345: Introduction to Econometrics

Course Information

Term: Spring 2021
Course: ECON 345-002
Class time: MW: 12-1:15PM
Location: Enterprise Hall 274

Contact

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Overview

This course will introduce you to the basic econometric techniques that are used in the social sciences. We will start by going over the simple regression model before moving into multiple regression, as well as some other techniques for use on panel data and time series data. The objectives of this course are to give you the ability to understand the empirical analyses performed by social scientists and the skills to do your own empirical analysis. By the end of the course you should be able to: 1.) Describe the difference between correlation and causation, 2.) Interpret statistical information whether that be in academic research or in the news, 3.) Use statistical software (e.g., Stata) to analyze data, 4.) Perform basic data analysis on your own, 5.) Evaluate the data analysis of others, and 6.) Create outputs such as regression tables or data visualization based on your data analysis.

The class will consist of twice weekly lectures where I will go over content for the week, give quizzes, and take any questions you all might have. In addition to in-person lectures, I will also post problem sets and other content on Blackboard. To login to your Blackboard account go to mymasonportal.gmu.edu and use your Mason NetID to access the course. If you are unfamiliar with using Blackboard please see this helpful [online course](#) (note that you must be logged in to Blackboard to access the online help material). You can also email me if you are having any issues. We will also be using the Cengage Mindtap service that comes with the required text for the course. To register for this service, follow the instructions [here](#).

We will be covering a lot of material over the course of the semester and it is important that you do not fall behind. Even if you have already been exposed to some of the early material, I want to encourage everyone to practice and make sure you have things down before we have moved on. The techniques we will be learning build upon each other so the more you fall behind the more difficult the content will become. One of the things I will do to ensure that everyone is making at least a minimal effort to engage with the content is to assign weekly knowledge checks through the Cengage Mindtap website associated with the textbook. This website also has videos and other resources that provide walk-throughs for material you may be stuck on. Get your money's worth and use these resources.

Required Text

Introductory Econometrics: A Modern Approach, 7e
by J.M. Wooldridge

Physical copy or eBook, Cengage Mindtap access also required.

Prerequisites

The prerequisites for this class are ECON 306 and 311, STAT 250 and 350, and/or STAT 344 and 354. We will review some mathematical tools and economic concepts you are familiar with but if you feel you are lacking in either the math or economics background here are some online sources that will help with the material covered in this class,

- Math is Fun: [Introduction to Derivatives](#), [Derivative Rules](#)
- Khan Academy: [Derivative as a concept](#), [Derivative as slope of curve](#), [Derivative notation review](#), [Basic derivative rules](#)
- Statistics review: [Basic statistical formulas](#)

Technology Requirements

The course will require a laptop, desktop, or tablet device and internet connection to complete assignments and access the course on both Blackboard and Cengage. If you desire to do video calls with me to discuss homework or other material you will need a web cam but if you are not comfortable showing your face please feel free to use audio only. I know that internet can also be unreliable when it comes to video calls but do not let that stop you from reaching out to me for help. Whether it is over email or through some other arrangement we can work together to make sure you are getting the help you need to succeed in this course. A calculator (four function, graphing, or scientific) will be required for exams.

You will also need to purchase a student license for the statistics software Stata. I recommend only purchasing a temporary license for the semester unless you plan on using it in the future. The licenses can be purchased [here](#). We will not be working with large data sets so the cheapest option (6 month license for Stata IC) at \$48 will work. If for whatever reason you cannot or do not wish to purchase the license for Stata you can access the software remotely from GMU at this [link](#).

Another option for statistical software is to use R. R is a free, open-source statistical software that can be used for data analysis. I want to be clear though, if you do not have any prior experience using R I would not recommend using this in place of Stata. Stata is a much more user friendly product and learning the commands necessary for this course will be relatively easy. If you do choose to use R, you will have to understand more complicated code that will take much longer to learn. That being said, you are free to use R to complete computer exercise assignments. If you want any resources for learning R, let me know and I will send you some links.

Grading and Coursework

Your grade will be made up of quizzes, assignments, a midterm exam, two research proposals, and a final, with weights distributed as shown in the table.

Category	Percentage
Quizzes	5%
Assignments	20%
Midterm	25%
Research proposals	25%
Final	25%

- **Quizzes:** There will be periodic quizzes covering the content in that week's reading and/or lecture slides. If you have done the reading and looked at the slides you should get 100% on every quiz. Quizzes will be given in the first ten minutes of class on a quiz day. **If you show up late to class on the day of a quiz you will be receive a 0.** I will announce quizzes a week in advance. Your lowest quiz score will be dropped and not counted in your final grade. The first quiz will be during the second week of class and ask you questions about the syllabus.

- **Assignments:** Most weeks you will be required to complete a Knowledge Check, on Cengage, for the material covered that week. Each Knowledge Check will be worth 10 points and the weeks you have them they will be made available on Monday and due that Friday by 11:59 PM. I will assign five computer exercise assignments from the textbook throughout the semester for you to complete individually or in groups if you like. Computer exercises will be turned in on Blackboard by 11:59 PM the Friday of the week they are listed as DUE on the Course Schedule below. If you do the computer exercises as a group, each group member must write up their own set of answers to be turned in. I will make myself available over email or Zoom to go over any questions.
- **Midterm:** The midterm will consist of multiple choice and longer answer questions. You will have the entire class period to complete the exam and can bring a single notebook sheet of paper (one side) for formulas and other notes to use on the exam.
- **Final:** The final exam is on **Monday, May 5, 2021 from 10:30AM-1:15PM**. The exam is cumulative covering material from the entire semester but with more weight given to the second half of the course. If your score on the final is higher than your score on the midterm, I will replace the midterm score with your final score. For example, if you scored a 70% on the midterm but receive a score of 95% on the final, when I enter in your final grades you will have a 95% on both the midterm and the final.
- **Research proposals:** After the midterm and before the final you will be required to submit a 3-4 page research proposal (two individual research proposals). See the Course Schedule for specific dates. These proposals will outline a research question that you could write a full paper on and include the data you would need to conduct this research, one or more hypotheses, references to related research, and the empirical method you will use to conduct your analysis. Think of this as a structured paper abstract. You can choose any topic you wish, my only requirement is that it has to be something you could write a full paper on if you needed to. I will post a full list of requirements on Blackboard as we get closer to the assignment.
- **Grading Scale:** The letter grade you receive will be based on the weighted percentage of all quizzes, assignments, midterm, paper, and final according to the scale in the table below. Borderline grades will be rounded up.

Letter Grade	Percentage
A+	96-100%
A	92-95%
A-	88-91%
B+	85-87%
B	81-84%
B-	78-80%
C+	75-77%
C	71-74%
C-	68-70%
D	60-67%
F	<60%

Office Hours and Communication

Office hours by appointment. I will send out more information about meeting on Zoom/Webex during the first week of class so we can coordinate on individual office hours as well as group meetings if desired. If you have any difficulties using the video conferencing software because of internet difficulties or other reasons please let me know and I can make separate accommodations. You can also email me about any questions you have. **Be sure to use your GMU email and put ECON 345 in the subject line.** I will usually get back to you within 24 hours or less. If you feel I have missed your email keep sending me emails until I respond.

Technology Policy

Laptops and tablets will be permitted during lecture. However, if you are being distracting to other students by not following along (e.g. scrolling through Twitter) you will be asked to put the device away or leave the class. Treat your laptop or tablet as a tool while in class. You can follow along with the lecture slides, take notes, go through examples in Stata that I do in class, and so on. Phones and other devices not being used to take notes, follow the slides, etc. should be put away and silenced. Again, if you are using your phone during class and being a distraction I will ask you to leave. Please be courteous of your fellow students.

Special Accommodations

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first [GMU Disability Services Office](#) for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email: ods@gmu.edu | Phone: (703) 993-2474

Academic Dishonesty

Cheating will not be tolerated and can result in a failing grade, dismissal from class, and expulsion from the university. If I suspect you of cheating, I will seek the appropriate punishment under George Mason University guidelines. Please review the [George Mason University Honor System and Code](#).

Important Dates and Other Links

Refer to the [GMU Registrar website](#) for important dates regarding add/drop deadlines and holidays. Information on religious holidays can be found on the [Mason University Life](#) website. Please contact me at least two weeks in advance if there is any conflict between the course schedule and your observation of a holiday so we can work together to make the appropriate arrangements.

[Student Privacy Rights](#)

[Learning Services](#)

[University Libraries](#)

[Counseling and Psychological Services](#)

Course Schedule

Week	Topic	Readings and Assignments
1: January 25th	Syllabus, course introduction, and review	Wooldridge:1.1-1.4, Math refreshers
2: February 1st	The simple regression model	Wooldridge: 2.1-2.2; Ch. 1 Computer Exercises (C1-C5) DUE
3: February 8th	OLS on sample data	Wooldridge: 2.3-2.4
4: February 15th	Unbiasedness and variance of OLS estimators	Wooldridge: 2.5
5: February 22nd	Other simple regression models	Wooldridge: 2.6-2.7; Ch. 2 Computer Exercises (C1-C6, C9-C10) DUE
6: March 1st	Intro to multiple regression analysis	Wooldridge: 3.1-3.2
7: March 8th	Midterm , Multiple regression continued	Review weeks 1-5 for midterm, Wooldridge: 3.3-3.5
8: March 15th	Applying multiple regression	Wooldridge: 3.7; Research Proposal 1 DUE
9: March 22nd	Statistical inference with multiple regression	Wooldridge: 4.1-4.7; Ch. 3 Computer Exercises (C1-C4, C11-C13) DUE
10: March 29th	Functional form and goodness-of-fit	Wooldridge: 6.1-6.4
11: April 5th	Dummy variables and heteroskedasticity	Wooldridge: 7.1-7.7, 8.1-8.2; Ch. 4-7 Computer Exercises DUE
12: April 12th	Panel data and difference-in-differences	Wooldridge: 13.1-13.5
13: April 19th	Instrumental variables and 2SLS	Wooldridge: 15.1-15.6; Ch. 13,15 Computer Exercises DUE
14: April 26th	Basic time series and final exam review	Wooldridge: 10.1-10.5; Research Proposal 2 DUE
15: May 3rd	Final exam	

Note: The course schedule lists only readings from the textbook. I will periodically assign readings and videos separate from the textbook that will be posted on Blackboard. Also, note that your weekly Knowledge Checks are not listed here. Please check our course site on Cengage for when those are due.