

ECON 345: Introduction to Econometrics

Course Information

Class Time: Tuesday and Thursday 12:00-1:15
Location: Nguyen Engineering Building 1109
Office Hours: By Appointment

Contact

Instructor: Amy Crockett
Email: acrocket@gmu.edu
Office: Buchanan D201

Course Overview: This course is designed to help you use modern statistical tools to analyze economic relationships. The objectives of this course are to build a solid, theoretical framework for econometric analysis, to perform critical analysis of policy and program initiatives, and apply these techniques to your own individual research programs. 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.

Textbook: We will be working out of *Introductory Econometrics: A Modern Approach, 7e* by J.M. Wooldridge. This is recommended but not required. Previous editions of the book will also work. Any additional readings will be assigned via Blackboard.

Software Requirement: You will also be required to use Stata for assignments. There are three options for gaining access to Stata. 1) The Fenwick Library has the Digital Scholarship Lab open Mon-Fri noon to 4 pm with other hours as specified at dsc.gmu.edu. The lab is found on the second floor of the library. 2) You can access Stata virtually on the [Virtual Computing Lab \(VCL\)](#). 3) A six month license is available for \$48 and is sufficient for this course. Otherwise, the perpetual Stata license is a great investment if you plan to continue using econometrics in your academic career.

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](#)

Grading and Coursework: Your grade will be made up of class participation, weekly homework, two research proposals, a midterm exam, and a final exam.

- **Class Participation:** This grade will be given each class. It will be given liberally for attendance and general participation. Some classes we will work problems in class. Those are expected to be completed in class to receive the participation grade for that day.
- **Weekly Homework:** There will be weekly assignments to help you practice the material we are learning. The material on the homework will be delayed a week. The material we learn in week one will be one the assignment due in week 2, etc. This will allow you plenty of time to ask any questions, deal with any technology issues, etc. The assignment will be due each week by 11:59 pm Saturday night on Blackboard. You are more than welcome to turn in the homework assignments early.
- **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

| Category | Percentage |
|---------------------|------------|
| Class Participation | 15% |
| Weekly Homework | 20% |
| Midterm | 20% |
| Research Proposals | 20% |
| Final Exam | 25% |

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, it must have economic theory backing it and have the potential to be turned into a full research paper. I will post a full list of requirements on Blackboard as we get closer to the assignment.

- **Midterm Exam:** 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 (two side) for formulas and other notes to use on the exam.
- **Final Exam:** The final exam is on **Thursday, December 8, 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. You can bring a single notebook sheet of paper (two side) for formulas and other notes to use on the exam.

Grading Percentages: All assignments must be submitted via Blackboard. Failure to complete an assignment may result in failure of the course. Borderline grades will be rounded up.

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|----|--------|----|--------------|
| A+ | 100-96 | | |
| A | 95-92 | C | 76-74 |
| A- | 92-90 | C- | 73-70 |
| B+ | 89-87 | D+ | 69-67 |
| B | 86-84 | D | 66-64 |
| B- | 83-80 | F | 63 and below |
| C+ | 79-77 | | |

Correspondence: I will respond to your emails within 24 hours during the weekdays. If I will be away from email for more than one day, I will post an announcement in Blackboard. Additionally, please be respectful of your instructor's time and avoid emailing with trivial or basic questions that can easily be answered by reading the syllabus, asking a classmate, or reviewing other course materials. If you still have a question after you have done your due diligence, please do not hesitate to contact your professor. Via email, remember to always follow standard email etiquette rules. While it does not need to be overly formal, how you choose to interact conveys your level of professionalism. This means you should always include an informative subject line, open your email by addressing your professor by name, the purpose of your communication should be clearly stated and concise, and you should close the email by signing off with your name. Lastly, review your email before sending to make sure what you have written is appropriate for email communication.

If you find yourself struggling to access this class in any sort of way—because of health issues, disabilities, basic needs efforts, or other personal circumstances— please make sure to talk to me, your professor, as soon as you can. Together we will figure out how to make this class work for you. Please do not wait until the end of the semester to come to me. There will be very little I can do to help you succeed in this class at that point.

Late Assignment Policy: You are responsible for completing assignments on time. Due dates are clearly indicated throughout this syllabus. I will accept late work up to two days late with a 10% penalty assessed for each day late. No late work will be accepted two days after the due date.

In the case of family and/or medical emergencies, I can make an exception to this policy based on the particulars of the case. However, if an emergency does arise, you should try to contact me before the actual due date (e.g., via email, day or night). I do not offer extensions to students after the due date has passed, except in the case of true family or health emergencies.

Mason Honor Code

Because this is a research methods course, it is essential that you become familiar early on with guidelines and

procedures for appropriately documenting your sources. The use of anyone’s material besides your own without proper documentation (i.e. **plagiarism**) is a serious offense. Punishments can range anywhere from a grade of “F” for the work to expulsion from the university. For more information on the University’s Honor Code, see <http://honorcode.gmu.edu>.

Accommodations

Disability Services implements and coordinates reasonable accommodations and disability-related services that afford equal access to university programs and activities. If you are seeking accommodations, please visit [http://ds.gmu.edu/](http://ds.gmu.edu) for detailed information about the Disability Services registration process.

Course Schedule

| Week (Day Starting) | Topic | Woolridge Sections | Assignment |
|---------------------|--|--------------------|--|
| 1 – August 22 | Syllabus, Course Introduction, Review | 1.1-1.4 | Due: Sat Aug. 27, by 11:59 pm |
| 2 – August 29 | The Simple Regression Model | 2.1-2.1 | Due: Sat Sep. 3, by 11:59 pm |
| 3 – September 5 | OLS on sample data | 2.3-2.4 | Due: Sat Sep. 10, by 11:59 pm |
| 4 – September 12 | Unbiasedness and variance of OLS estimators | 2.5 | Due: Sat Sep. 17, by 11:59 pm |
| 5 – September 19 | Other Simple Regression Models | 2.6-2.7 | Due: Sat Sep. 24, by 11:59 pm |
| 6 – September 26 | Intro to multiple Regression Analysis | 3.1-3.2 | Due: Sat Oct. 1, by 11:59 pm |
| 7 – October 3 | MIDTERM, Multiple regressions continued | 3.3-3.5 | No Homework |
| 8 – October 10 | Applying Multiple Regression | 3.7 | Due: Sat Oct. 15, by 11:59 pm |
| 9 – October 17 | Statistical Inference with multiple regressions | 4.1-4.7 | Due: Sat Oct. 22, by 11:59 pm Research Proposal 1 Due |
| 10 – October 24 | Functional form and goodness-of-fit | 6.1-6.4 | Due: Sat Oct. 29, by 11:59 pm |
| 11 – October 31 | Dummy variables and heteroskedasticity | 7.1-7.7,8.1-8.2 | Due: Sat Nov. 5, by 11:59 pm |
| 12 – November 7 | Panel Data and Difference-in-differences | 13.1-13.5 | Due: Sat Nov. 12, by 11:59 pm |
| 13 – November 14 | Instrumental Variables and 2SLS | 15.1-15.6 | Due: Sat Nov. 19, by 11:59 pm Research Proposal 2 Due |
| 14 – November 21 | Experimental Data | | No Homework |
| 15 – November 28 | Basic Time Series and Final Exam Review | 10.1-10.5 | Due: Sat Dec. 3, by 11:59 pm |
| 16 – December 5 | FINAL EXAM Thursday December 8 from 10:30 – 1:15 | | |

Campus Closure: If the campus closes or class is canceled due to weather or other concern, students should check Blackboard and monitor their email for updates on how to continue learning and information about any changes to events or assignments.

Safe Return to Campus Statement: Students are required to follow the university's public health and safety precautions and procedures outlined on the university [Safe Return to Campus webpage](#). Similarly, all students in face to face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.

Classroom and Technology Policy:

You will need a reliable computer and internet access to view and engage with the course materials and tools.

Hardware/Software

You will need access to a Windows or Macintosh computer with at least 2 GB of RAM and access to a fast and reliable broadband internet connection (e.g., cable, DSL). Chrome or Firefox are two recommended browsers. A larger screen is recommended for better visibility of course material. You will need camera and headphones/microphone to do the virtual classroom activities. Speakers or headphones will be necessary to watch media/recorded content. For the amount of Hard Disk Space required taking a distance education course, consider and allow for:

1. the storage amount needed to install any additional software and
2. space to store work that you will do for the course.

You will need software that enables you to read PDF documents and view videos ([Acrobat Reader](#), [Flash](#), [Java](#), and [Windows Media Player](#), [QuickTime](#) and/or [Real Media Player](#)). Microsoft Word (preferable) or Pages as well as PowerPoint.

For more information about setting up your computer and downloading free software for students (like Microsoft Office 365), go to Mason Online: "[What Technologies do I Need?](#)"

Blackboard (BB):

Use of Blackboard is mandatory. All course information from the syllabus, assignment descriptions and recorded content to assignment submissions and the posting of grades are managed on our course pages on Blackboard. Any revisions to the syllabus or other class business will be posted to the "Announcements" section on Blackboard.

Since Blackboard is a web-based course management system, it is crucial to have an internet connection to access it. An inability to access the internet for a last-minute assignment submission is not an acceptable late excuse. Further, Blackboard can be slow. At times, it can take longer than you may have expected to submit large files (i.e. your oral presentation); therefore, be sure you have a strong internet connection and allow extra time to submit your assignments completely.

Course Materials and Student Privacy: Video recordings—whether made by instructors or students—of class meetings that include audio, visual, or textual information from other students are private and must not be shared outside the class.

Live video conference meetings (e.g. Zoom) that include audio, textual, or visual information from other students must be viewed privately and not shared with others in your household or recorded and shared outside the class.

University Policies and Resources

GMU Library: There are two libraries on Fairfax Campus: Fenwick and Gateway in the Johnson Center. You should be

acquainted with these locations and how to use the library online catalog and databases. If you need any help with the library, please do not hesitate to contact the library staff. <http://library.gmu.edu/>

Academic Honesty: You are expected to be familiar with and abide by the University's Honor Code. It is your responsibility to see me if you have questions about these policies. George Mason University has an honor code that states the following: To promote a stronger sense of mutual responsibility, respect, trust, and fairness among all members of the George Mason University community and with the desire for greater academic and personal achievement, we, the student members of the University Community have set forth this. Additionally, students must follow the university policy for Responsible Use of Computing.

University Communications: Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.

Counseling Center: Student Union I, Room 364, 703-993-2380.

The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance.

Office of Disability Services: (703-993-2474; SUB I, Room 2500)

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester. All academic accommodations must be arranged through that office. Please note that accommodations **MUST BE MADE BEFORE** assignments or exams are due. I cannot adjust your grade after the fact.

Writing Center: (703-993-1200 Robinson A, Room 114)

The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. The writing center includes assistance for students for whom English is a second language.

Learning Services: (703-993-2380; SUB I, Suite 3129) provides, at no cost, study skills workshops can help you improve your academic performance. These workshops include strategies for note-taking, reading, exams, memory and organization, time-management, performance anxiety, and improving concentration. They are offered multiple times throughout the semester. Workshop descriptions, schedule and registration information is online. <https://learningservices.gmu.edu/academic-success-workshops/>.

Patriot Pantry: (SUB I, Room 3200) provides access to non-perishable food items and toiletries to GMU students who are unable to afford them. The Pantry is donation-based and run by students and volunteers by the Student Support and Advocacy Center (SSAC) in University Life. In addition to providing non-perishable food and personal items, it educates student users about the resources available on campus and in the surrounding community. For COVID alternations to service and for more information: <https://ssac.gmu.edu/patriot-pantry/>

Diversity/Inclusion Statement: The Honors College, an intentionally inclusive community, promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and ability status.

- We value our diverse student body and desire to increase the diversity of our faculty and staff. We commit to supporting students, faculty and staff who have been the victims of bias and discrimination.

- We promote continuous learning and improvement to create an environment that values diverse points of view and life experiences.
- We believe that faculty, staff and students play a role in creating an environment that engages diverse points of view.
- We believe that by fostering their willingness to hear and learn from a variety of sources and viewpoints, our students will gain competence in communication, critical thinking and global understanding, and become aware of their biases and how they affect their interactions with others and the world.

Anti-Racism Statement: As a member of the George Mason University community, I will work to create an educational environment that is committed to anti-racism and inclusive excellence. An anti-racist approach to higher education acknowledges the ways that individual, interpersonal, institutional, and structural manifestations of racism against Black individuals, indigenous people, and other people of color contribute to inequality and injustice in our classrooms, on our campuses, and in our communities. Anti-racist work strives to provide our community members with resources to interrupt cycles of racism so as to cultivate a more equitable, inclusive, and just environment for all of our students, staff, faculty, alumni, and friends, regardless of racial background. I believe that the work of anti-racism starts with each individual; together students and faculty in this course will build knowledge and take actions rooted in principles of equity, inclusion, and justice that we will carry with us throughout our lives.