

Brantly Callaway

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University of Georgia

Department of Economics

ECON 4750

Fall 2023

# Introduction to Econometrics

## Syllabus

**Course Time:** MWF 12:40–1:30

**Location:** BLC Benson Hall C006

**Office Hours:** Wednesday 2:45–3:45pm or by appointment (in person or via Zoom)

**Teaching Assistant:** Seth Smith (primary), email: [seth.smith@uga.edu](mailto:seth.smith@uga.edu), office hours: Tuesday, 9:00–10:00 (in person) or **TBD** (Zoom). Joe Spearing (secondary), email: [joe.spearing@uga.edu](mailto:joe.spearing@uga.edu), office hours: Thursday, 1:45–2:45, Amos B450 (in person) or <https://zoom.us/j/2444530117> (Zoom)

### Course Description:

Econometrics is the field of economics that combines statistical methods and economic theory to analyze economic data. This course provides an introduction to econometric theory and methods for undergraduate students. The topics include regression analysis, working with cross sectional and panel data, and dealing with common challenges in economics and business by those analyzing data. Fair warning: the course is relatively math intensive (though only knowledge of algebra and basic probability and statistics is required) and requires quite a bit of computer programming (very little prior experience is required here either). We will work with real data and develop the skills needed for carrying out empirical work.

### Course Outline:

1. Introduction to Statistical Programming
2. Crash Course on Probability
3. Properties of Estimators
4. Linear Regression
5. Introduction to Prediction
6. Causal Inference

### Course Materials:

- Course Website ([https://bcallaway11.github.io/Courses/ECON\\_4750\\_Fall\\_2023/](https://bcallaway11.github.io/Courses/ECON_4750_Fall_2023/))

- eLC ([elc.uga.edu](http://elc.uga.edu))

### Textbook:

- (1) Course Notes ([https://bcallaway11.github.io/econ\\_4750\\_notes/](https://bcallaway11.github.io/econ_4750_notes/))
- (2) **Strongly Suggested:** Introduction to Econometrics, 4th Edition, by James Stock and Mark Watson.  
[The course will mainly rely on the Course Notes. That said, there are cross references in the Course Notes to the Stock and Watson textbook. In principle, the textbook is not strictly required, but I recommend acquiring the book (or a previous version) if possible.]

**Additional References:** (these are all free to download; they are not main textbooks but I sometimes consult them for the class and could potentially be useful for you to consult in the future)

- (1) For R programming: Introduction to Econometrics with R, by Cristoph Hanck, Martin Arnold, Alexander Gerber, and Martin Schmelzer (<https://www.econometrics-with-r.org/>)
- (2) For prediction/machine learning: An Introduction to Statistical Learning, by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani ([https://web.stanford.edu/~hastie/ISLRv2\\_website.pdf](https://web.stanford.edu/~hastie/ISLRv2_website.pdf) and <https://www.statlearning.com/>)
- (3) For causal inference: Causal Inference: The Mixtape, by Scott Cunningham (<https://mixtape.scunning.com/>)

### Software:

We will use R (<https://www.r-project.org/>) to analyze data. R is freely available and available across platforms. You should go ahead and download R for your personal computer as soon as possible. It is also available at most computer labs on campus.

I also recommend using RStudio as a tool for writing code in R. You can download it here: <https://www.rstudio.com/products/rstudio/download/#download>; choose the free version based on your operating system (Windows, Mac, etc.).

If you have a laptop, I recommend bringing it to class. We will often spend 15-30 minutes of class working on problems using actual data, and I think that it is most helpful for you to be able to work on the problem as I go through it with the class.

### Additional R References:

There are tons of free R resources available online. Here are some that seem particularly useful to me.

- (1) Manageable Introduction: [Introduction to R and RStudio](#), by Stephanie Spielman

- (2) Full length book: [Introduction to Data Science: Data Analysis and Prediction Algorithms with R](#), by Rafael Irizarry (this is way more than you will need for this course, but I suggest checking out Chapters 1, 2, 3, and 5, and there's plenty more that you might find interesting).
- (3) Full length book: [STAT 545: Data Wrangling, exploration, and analysis with R](#), by Jenny Bryan

### **Terry Analytics Lab:**

The Terry Analytics Lab (TAL) provides free tutoring services in econometrics, senior theses, and economics research. This is a very useful resource for our class. The details for TAL have not been finalized yet for this semester, but I will provide an update as soon as they are. More information will be forthcoming on the Terry Analytics Lab eLC page, and they encourage students to ensure that notifications for the lab page are turned on so that they can receive important scheduling updates.

### **Homeworks:**

There will be roughly 5 homeworks throughout the semester. They will be a mix of problems and data work. Homeworks will be due at the start of class, and I do not accept late homeworks. You should turn in a hard copy of your homework. For coding homeworks, I expect both the code written and the output of the code should be turned in, and I expect the results to be very concise (in general, less than 1 page per answer).

### **Projects:**

The course will involve two projects. Roughly: one will be scheduled for the middle of the semester, and the other will be scheduled for the end of the semester.

### **Tests:**

There will be two midterms and a final exam. The exams will be taken in class.

- Midterm 1: Friday, Sept. 22, in class
- Midterm 2: Wednesday, Oct. 25, in class
- Final Exam: Friday, Dec. 8, 12:00–3:00pm

### **Attendance:**

In-person attendance for the class is required. In plain words, you are not authorized to miss class for no reason, sleeping late, etc., but you are authorized to miss class due to any health issues and do not need to provide any documentation (e.g., doctor's note) unless the number of absences starts to add up. I'll periodically take attendance for our class.

**Grades:** Grades will be 50% exams (15% for each midterm, 20% for the final exam), 20% homeworks, and 10% for each project, and 10% for attendance/participation.

A	A-	B+	B	B-	C+	C	C-	D	F
93-100	90-93	87-90	83-87	80-83	77-80	73-77	70-73	60-70	<60

I may curve some exams and/or final exam grades.

## ECON 6750 and Honors Option

For students enrolled in ECON 6750 or in the Honors option for the course, there are two additional requirements: (i) more extensive versions of the two course projects, and (ii) one additional question on each exam.

## Course Statements and Policies

- UGA Student Honor Code: "I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." A Culture of Honesty, the University's policy and procedures for handling cases of suspected dishonesty, can be found at [www.uga.edu/ovpi](http://www.uga.edu/ovpi).
- The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.
- Mental Health and Wellness Resources:

If you or someone you know needs assistance, you are encouraged to contact Student Care & Outreach in the Division of Student Affairs at 706-542-7774 or visit <https://sco.uga.edu/>. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.

UGA has several resources for a student seeking mental health services <https://www.uhs.uga.edu/bewelluga/bewelluga> or crisis support <https://www.uhs.uga.edu/info/emergencies>.

If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA <https://www.uhs.uga.edu/bewelluga/bewelluga> for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.

Additional resources can be accessed through the UGA App.

- Unless explicitly stated, artificial intelligence-based technologies, such as ChatGPT, must not be used to generate responses for student assignments.