ECON 4600: Econometrics

Spring 2024 Syllabus

Basic Course Information

Instructor:	Chris Vickers / `czvickers@auburn.edu` / Office: 133 Miller Hall
Teaching Assistant:	Arunima Paul / `azp0141@auburn.edu`
Meeting time:	TuTh 3:30PM-4:45PM (Lecture) M 3:00PM-3:50PM (Recitation)
Location:	Miller 230 (Lecture and recitation)
Office hours:	Wednesday 3:00PM-4:30PM, Thursday 1:00PM-2:00PM, and by appointment
Textbook:	*Mastering 'Metrics* by Angrist and Pischke. Copies are available in the bookstore.
Website:	Canvas

Description

The primary goal of this course is to give an introduction to econometrics with a particular emphasis on causal inference. A secondary goal is to introduce the rudiments of programming and data management. Finally, this class is an opportunity to write a major research paper.

This is the capstone class in the economics major. It develops the skills most demanded of you in the job market. Unsurprisingly, *this class is very challenging*.

We will be learning `R` in this class. `R` has some key advantages:

1. It is free and open source
2. It is the most popular statistical program in academia and the private sector
3. It is less idiosyncratic than other languages popular in economics, such as `Stata`, and probably better training for other languages

Prerequisites

I will assume familiarity with multivariate calculus as well as an introductory course in probability and statistics. I will briefly review basic statistics and probability theory at the start of class.

Recitation

Every Monday there will be an hour-long recitation section with Arunima Paul. The main point of this session is to help you learn about how to use `R` in a hands-on setting. This means that if you have a laptop, bring it to the recitation. Quizzes will also be taken during this time.

Office Hours

You are welcome to come to my office hours without making an appointment. If those times do not work for you, email me to set up an appointment. Arunima will announce her office hours as well.

Communication

Please feel free to email me if you have any questions or concerns about the course. I will attempt to answer them promptly. Sometimes emails do get lost in my inbox so I encourage you to follow up if you do not hear from me within two business days. If you have a *substantive* question (e.g., "Can you explain X from class?"), it is usually best to come address that in person with me. If you have a purely *administrative* question, email is fine (but check the syllabus first). Questions about R are best addressed to Arunima.

Accessibility

If you require any additional accommodations, please come speak with me in person or email me. You are welcome to come to my office hours or set up an appointment. Please do so as soon as possible.

Evaluation

Quizzes There will be 6 in-class, closed note, closed book quizzes that will take about 20 minutes each. The questions on these quizzes will be mainly theoretical and conceptual. They will include a mix of multiple choice and short answer questions. I will provide non-mandatory practice problems to help you prepare for the quizzes.
There will also be a *short* "bonus quiz" available online during exam week and due before 11:59pm on Wednesday, May 1. I will increase your lowest quiz score by up to 10 percentage points based on this quiz.

Cases There will be 5 "cases", where you will have a chance to practice programming or working with real data. You will use `R Markdown`, allows for mixing prose, code, and graphical output, to write up your results. There is not much added difficulty to using this beyond learning how to use `R` in the first place. Arunima will cover `R Markdown` in recitation. Cases will be due on Friday by 3:59pm of the week it is due.

Empirical Project You will complete a major empirical project in this class. The evaluation of it will consist of several components:

1. A 12-15 page paper on an original research question of your choosing, due by the end of the semester
2. A 15-18 minute presentation of your paper
3. Replication code for your paper
4. "Checkpoints": Throughout the semester, there will be a number of short assignments due to make sure you are on track to complete the paper

Final grades

Final grades will be calculated based on the following weights:

Quizzes: 30%

Cases: 25%

Paper: 25%

Presentation: 10%

Replication code: 5%

Checkpoints: 5%

The "ten point scale" guarantees a *minimum* letter grade. That is, if you receive 90%, you will receive an A for sure, above 80% a B, etc. If necessary, I will curve grades upward (but never downward), depending on class performance.

Not withstanding the above, you will *not* pass this class even if you get 100% on the cases and quizzes but do not submit a final paper.

Readings

The primary textbook will be *Mastering 'Metrics* by Joshua D. Angrist and Jörn-Steffen Pischke. There are a few other readings on the syllabus that are available on the course website. One of my goals in using this textbook (and taking the approach that I am) is to make econometrics slightly less intimidating and more accessible by making it (slightly) less math intensive. There will still be equations and formalism, but I am trying to deemphasize some of the tedious calculations you find in more traditional econometrics classes.

While this textbook is an idiosyncratic introduction to econometrics, there are numerous other solid introductory econometrics texts out there. Some examples include texts by Wooldridge or Stock and Watson. Links to where you can find these books on Amazon are under the "Econometrics Readings and Resources" tab. I have also provided links to some more advanced texts that might still be useful. There's no one right way to present a topic, and often different explanations will be clear to different people. Another good approach if you are confused is to just start Googling!

All Access

For more information: http://aub.ie/allaccess

What is All Access?

All Access is the Bookstore's inclusive access program, which converts previously physical course materials into digital content. This material is ready and waiting for you on the first day of class and is free until drop/add day (for the fall and spring semesters, that's two weeks free).

The cost of All Access materials has been negotiated to offer you the best price available. The All Access Program also eliminates the stress of finding the exact course materials for your class and the strain of carrying bulky, physical textbooks, all while saving you money. It's all of the text without the book.

How is All Access charged

If you're still opted in on February 1st, then we'll send the charge to your next ebill. This will be labeled as the course on your ebill so you'll know. You'll get a reminder on January 30th to remind you about the deadline.

How do I opt out?

Don't feel like All Access is right for you? You can opt out before the drop/add deadline and you will not be charged.

Directions for opting out may be found here.

If you choose to opt out, make sure you will not need access to any of the materials for courseware for homework assignments, lab work, quizzes, and exams.

How can I get a print version of an All Access textbook?

If your course shows that there's a low cost print version companion available, you must remain opted in for the digital version on Canvas in order to be eligible to get the low cost print. These are usually between $20 and $35.

Request a copy by email to MNH0016@auburn.edu with your course information included. These are usually available for purchase the third week of class, and must be paid for inside the Bookstore (not available for charging to ebill).

What if I'm on scholarship?

We will charge All Access content to any scholarship that we charge at the Bookstore. Those will be done automatically when we bill. If you are a scholarship student and would prefer print, please email MNH0016@auburn.edu and we can order print copies for you.

These are done as requested, and take three to five business days to arrive. Most scholarships will not pay for All Access and a print copy of the book, so you will need to opt out if you choose to order a print version.

What is the refund policy?

After the opt out deadline, we can only offer refunds to students who have dropped the course or withdrawn from the university. That's why the opt out deadline will be crucial for you to decide if you want to be charged or not.

Attendance Policy

Attendance at lectures is strongly encouraged but not mandatory. People who do not attend class with some regularly forfeit the right to use my office hours. (That is, I will not act as a personal tutor for students who are regularly absent.) You are responsible for any material covered and for any changes to the course that may be announced in class. Should you miss a lecture for whatever reason, it is your responsibility to get the material from someone in the class. You are required to put your mobile devices away when you attend lecture.

Regrade Policy

If you believe that I have made a mistake in grading your quiz, I ask you to return it and submit a written request describing the nature of the mistake within a week. I will regrade the *entire* quiz once I have granted the request. Please note that because everyone in the class is subject to the same scoring rubric, I will not accept requests based entirely on your disagreement with it.

Academic Integrity

Academic dishonesty will not be tolerated. Consult the *Auburn University Academic Honesty Code* for more details. I will assume that you have been abiding by the code unless you show me evidence otherwise; at which point I will seek out the maximum allowable penalty for any academic dishonesty that occurs in this course. If you have questions about which behaviors are acceptable, please ask me.

Tentative Schedule

This is a tentative schedule and I will update if changes are necessary. The recitations listed as "Project Workshop" have no fixed format but provide an opportunity for you to come work on your project or other assignments with Arunima there to answer questions.

MONDAY	TUESDAY	THURSDAY	FRIDAY
Jan 8th	9th	11th Review of Probability	12th
15th No Class: MLK Day	16th Prob. Cont.	18th Review of Statistics	19th
22nd Intro to R	23rd Statistics Cont.	25th Randomized Trials	26th
29th **Quiz 1** R Markdown	30th RCTs Cont.	Feb 1st RCTs Cont.	2nd **Case 1 - Starting with R**
5th Working with Data	6th RCTs Cont.	8th Empirical Project Example	9th
12th **Quiz 2** Data Cleaning	13th Example Cont.	15th Regression	16th **Case 2 - Testing the CLT**
19th Data Cleaning Cont.	20th Regression Cont.	22nd Regression Cont.	23rd
26th **Quiz 3** Running Regressions	27th Regression Cont.	29th Regression Cont.	Mar 1st **Case 3 - Working with Data**
4th No Class: Spring Break	5th No Class: Spring Break	7th No Class: Spring Break	8th No Class: Spring Break
11th Project Workshop	12th Regression Cont.	14th Regression Cont.	15th **Checkpoint 1**
18th **Quiz 4** Regressions Continued	19th Instrumental Variables	21st IV Cont.	22nd **Case 4 - TBD**
25th IV Regessions	26th IV Cont.	28th IV Cont.	29th **Checkpoint 2**

MONDAY	TUESDAY	THURSDAY	FRIDAY
Apr 1st **Quiz 5** IV Regs Continued	2nd Regression Discontinuity	4th No Class	5th **Case 5 - Paper Replication**
8th Project Workshop	9th RD Cont.	11th Differences-in-Differences	12th **Checkpoint 3**
15th **Quiz 6** DiD	16th DiD Cont.	18th DiD Cont.	19th
22nd Project Workshop	23rd Wages of Schooling	25th Wages Cont.	26th **FINAL PAPER DUE**

Readings

This is a tentative list of the readings associated with each section of the course; it is subject to revision. Readings not from the primary textbook will be available on Canvas.

- Probability: Helwig notes
- Statistics: Ch. 1 appendix
- Randomized trials: Chapter 1
- Empirical Project: TBD
- Regression: Chapter 2 including appendix
- Instrumental variables: Chapter 3 including appendix
- Regression discontinuity: Chapter 4 including appendix
- Differences-in-differences: Chapter 5 including appendix
- Wages of schooling: Chapter 6 including appendix