Introduction to Econometrics [EC421]

Winter 2022 Syllabus

Dr. Edward Rubin, Dept. of Economics, University of Oregon

Basics

	Lecture	Lab	
⏲	Mo. & We. 2:00p–3:20p	See below	
📍	129 McKenzie Hall	See below	
👤	**Edward Rubin**	**Emmett Saulnier**	
✈	edwardr@uoregon.edu	emmetts@uoregon.edu	Use "EC421" in email subject.
❯	edrub.in	emmettsaulnier.com	
⦿	TBA (Zoom)	TBA (Zoom)	Feel free to contact us if you cannot make these office hours.
📕	Introduction to Econometrics, 5th ed.		
📕	Mastering 'Metrics: The Path from Cause to Effect		

Email note: We will do our best to respond promptly to your emails. Our responses may be slower over weekends/holidays. There may be times that our responses take up to 48 hours. Please do not repeatedly send the same email.

Materials from previous courses

❯	https://github.com/edrubin/EC421W21	421, Winter 2021 course on Github
❯	https://github.com/edrubin/EC421S20	421, Spring 2020 course on Github
❯	https://github.com/edrubin/EC421W20	421, Winter 2020 course on Github
❯	https://github.com/edrubin/EC421S19	421, Spring 2019 course on Github
❯	https://github.com/edrubin/EC421W19	421, Winter 2019 course on Github

	Monday Labs	Tuesday Labs
Synchronous lab	4:00p–5:20p (PST), 442 McKenzie Hall	4:00p–5:20p (PST), 442 McKenzie Hall
Asynchronous lab	Zoom (links on Canvas)	Zoom (links on Canvas)
Lab instructor	**Emmett Saulnier**	**Emmett Saulnier**
	emmetts@uoregon.edu	emmetts@uoregon.edu

Labs: There are two synchronous labs—open for anyone to attend. We will also record each of these synchronous labs and make the videos/materials. You are allowed to attend a lab different from the one you registered for.

Learning/patience

As I am sure you are aware, we *all* are facing a lot of changes and challenges this quarter—true for the last two years.

I am going to do my best to offer you a high-quality econometrics course. There will be hiccups along the way—technology, logistics, health, etc.—and I request your patience along the way. I know you are also dealing with a lot of challenges, so I offer my own patience to you. Let's make the best of this situation.

Recommendations

1. **Be kind**.

2. **Take responsibility** for your own education and try to **learn** as much as you can.

3. **Do your own work**.

4. Develop your **intuition**—*e.g.*, why does regression work in one situation and fail in another?

5. **Learn** R. Struggle while you try—and use **Google** to figure things out.

6. Come to **office hours**.[1]

7. **Ask for help early**—don't wait until the end of the term.

8. **Leave enough time to get help** (start assignments/projects early enough to get help with issues).

Course summary

Description: This course aims to prepare economics majors for the demands of real-world applications and for the econometrics required by other 400-level classes. Toward this goal, we will examine the assumptions that underly the econometric and statistical models that you learned in Economics 320 (along with Math 243). These models imposed strong assumptions that are often violated in practice. We will relax these assumptions—replacing them with looser, more palatable assumptions—and derive, build, and estimate the resulting new models. By the end of this course, students should have the ability to statistically examine the bulk of economic issues using econometrics—knowing how to empirically test economic models and knowing the strengths, weaknesses, and assumptions of their chosen route of analysis.

Learning statistical programming is inherent to practicing applied econometrics. Thus, throughout this course we will also teach the statistical programming language R.

Prerequisites: This course requires Economics 320 (Introduction to Econometrics)—we assume you are comfortable with the content in the first six chapters of the Dougherty *Introduction to Econometrics* (ItE) textbook.

Software and tools

R: We will use the statistical programming language `R`, and we will use `RStudio` to interact with R.

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[1]Two related articles from NPR on office hours: *College Students: How to Make Office Hours Less Scary* and *Uncovering A Huge Mystery Of College: Office Hours*.

Learning R: will require time and effort, but it is a powerful and versatile tool that is valued by many employers. Put in the requisite effort and time, and you will be rewarded. Computers around the university already have R, but I strongly recommend that you install R and RStudio on your own computer.

   If you are concerned about learning R—or want to learn more/quickly—I suggest that you check out the following free, online resources.

- DataCamp's *Introduction to R*

- TeamLeada's *R Bootcamp*

- Computerworld's *Beginner's guide to R*

The folks at RStudio put together a very nice set of resources.

Labs, homework, and exams

Lab: This course includes a lab, which is integral to learning the material in (and passing) this course. For now, we are requesting that you attend the lab for which you registered. The lab includes both general econometrics instruction and computing tips necessary to complete the homework assignments—linking the lecture material to R—as well as topics which the lecture may not be cover. **The lab is the best way you can get quick feedback and help in this course.** The GEs will also post a video for you to watch before the remote lab meeting/call.

   See above for lab times.

Problem Sets

- You will **turn in assignments online via Canvas**. The submission should include your written answers and your figures—and a separate file for your code.

- Assignments will be due approximately every 1–2 weeks.

- Assignments **must be in your own words**. **Do not copy**.

- See below for **late policy**.

Feel free to work together on the assignments. Unless explicitly stated, **each student is required to write and submit independent answers**. This means that word-for-word copies will not be accepted and will be viewed as academic dishonesty. In other words: You must place answers **in your own words**. **Copying from other people (even if you worked with them) or from previous assignments is considered cheating.**

Late policy

- We accept assignments **up to 48 hours late**, but we **subtract 2 percentage points for each hour it is late.**

- For example, you turn in an assignment 12 hours late and would have received 85%. We subtract $12 \times 2 = 24$ percentage points, meaning you will receive 85%−24%=61%.

- No exceptions.

Exams

- The **in-class midterm will likely be February 9, 2022 (during class)**.

- The **final exam will be on Tuesday, March 15, 2022, 2:45p–4:45p**.

We will not offer early exams. Each exam will be accompanied by a more open-ended project.

Grades

Grades for this class will be assigned based on the following assignments: (approximately) biweekly homework assignments, one midterm exam, one final exam, and two projects. Final grades will be determined based on your rank-ordered position within the class (*i.e.*, the course is curved). You can track your grades for individual assignments on Canvas. The weights for the final grade:

Problem Sets	40%
Midterm: Exam and Project	30%
Final: Exam and Project	30%

Textbook and other readings

One of the goals of this course is to make you aware of the incredible array of instruction material that is freely available online. I also want to encourage you to be entrepreneurial (key for learning to program).

Econometrics books: There are two recommended textbooks for this course.

1. **Mastering 'Metrics: The Path from Cause to Effect** by Angrist and Pischke (**MM**)

2. **Introduction to Econometrics**, 5th ed. by Christopher Dougherty (**ItE**)

You should be able to purchase these books at the UO Duckstore or on Amazon (you should already have ItE from EC320). I recommend that you read the assigned readings from the textbooks. The texts provide another, complementary perspective on the material that we cover in lecture. The course schedule (farther below) contains suggested readings for each topic.

R books: For learning R, I recommend Garrett Grolemund and Hadley Wickham's *R for Data Science*, which is available for free online. Want to go deeper? Check out **Advanced *R*** (Hadley Wickham, again) and **Data Visualization: A practical introduction** (Kieran Healy)—both books are free online.

Honesty and academic integrity

You must do your own work. Do not claim credit for any work other than your own. Cheating or plagiarizing of any sort on any component of this class will result in a failing grade for the term and a report of the offense to the university. Anything you submit with your name must be in your own words. Copying from other sources—including classmates, previous assignments, and websites—is cheating. Please acquaint yourself with the Student Conduct Code.

Accessibility

If you have a documented need and would like accommodations in this course, please make arrangements with me during the first week of the term. Please request that the Accessible Education Center send me a letter verifying your accommodations.

COVID-19 and safety

The University of Oregon (UO), in accordance with guidance from the Centers for Disease Control, Oregon Health Authority, and Lane County Public Health requires faculty, staff, students, visitors, and vendors across all UO locations to use face coverings when in UO owned, leased, or controlled buildings. This includes classrooms. Please correctly wear a suitable face covering during class. Students unable to wear face coverings can work with the Accessible Education Center to find a reasonable accommodation. Students refusing to wear a face covering will be asked to leave the class.

    If the professor or GE is made to feel threatened or uncomfortable by a student aggressively or repeatedly refusing to properly wear a mask, the student will be reported to the university and asked to withdraw from the class (or the student will receive an F).

Academic disruption

In the event of a campus emergency that disrupts academic activities, course requirements, deadlines, and grading percentages are subject to change. Information about changes in this course will be communicated as soon as possible by email, and on Canvas. If we are not able to meet face-to-face, students should immediately log onto Canvas and read any announcements and/or access alternative assignments. Students are also expected to continue coursework as outlined in this syllabus or other instructions on Canvas.

    In the event that the instructor of this course has to quarantine, this course may be taught online during that time.

Tentative course outline

The table below presents the current plan for the course outline and associated textbook reading assignments. We will occasionally assign papers for you to read for class, lab, or your homework assignments. I will post these papers on Canvas. As the title of this section suggests, the timing and topics on this schedule may change.

Tentative course schedule

Class	Date	Topics	Suggested readings
01	01/03	Intro & Pre-Quiz	ItE 1–6
02	01/05	Review	ItE 1–6; MM 2
03	01/10	Review	ItE 1–6; MM 2
04	01/12	Review	ItE 1–7
04	01/17	**Martin Luther King, Jr Day** (no class)	
05	01/19	Heteroskedasticity	ItE 7
05	01/24	*Flexible*	
06	01/26	Consistency (and Inconsistency)	ItE pp. 68–75
09	01/31	Time Series	ItE 11
09	02/02	Time Series	ItE 11
10	02/07	Midterm Review	ItE 12
11	02/09	**Midterm and project**	
13	02/14	Autocorrelation & Nonstationarity	ItE 12 & 13
14	02/16	*Flexible*	
15	02/21	Causality	MM 1
16	02/23	Instrumental Variables	ItE 9; MM 3
17	02/28	Instrumental Variables	ItE 9; MM 3
18	03/02	Panel Data Methods	ItE 14; MM 5
19	03/07	Panel Data Methods	ItE 14; MM 5
20	03/09	Difference in differences	MM 5
	03/10	**Final project due**	
	03/15	**Final exam, 2:45p–4:45p**	