

**RUTGERS UNIVERSITY
DEPARTMENT OF ECONOMICS**

**ADVANCED ECONOMETRICS FOR MICROECONOMIC DATA (220:422:01)
Fall 2022**

Class meetings: Tuesdays and Thursdays 3:50 – 5:10pm
 Hardenbergh Hall A6

Instructor: Professor Anne Morrison Piehl
 anne dot piehl at rutgers edu (put **ECON 422** in subject of email)

Office Hours: See professor before/after class, sign up on Canvas for open hours, or
 email for an appointment

Version: August 29, 2022. This syllabus is subject to revision at any point during the term, especially regarding changing public health conditions. Announcements on the course Canvas website, in class, or by email supersede anything written here.

Public Health: This course will operate in compliance with university requirements and guidance to promote health. At this time, masks are required. Any special health concerns should be addressed privately to the professor.

Course Description and Learning Goals: The historical development of economics is marked by attempts to get a handle on pressing real concerns through simple but useful models that capture the essential features of what makes an economic system work and how it can sometimes be manipulated to improve things. Econometrics is the study of measurement and estimation, both to test theories and to provide stylized facts, that is, to identify the “essential features” of the economy. Econometrics is useful for providing answers to big questions as well as for a myriad of smaller questions that cumulate to be important. The everyday work of economics that really matters, inside and outside of academia, often involves econometrics. It is where theory meets reality.

This course covers applications of econometrics to a wide variety of research questions in in microeconomics, with particular attention to the conditions allowing for causal interpretation. By the end of the course, students will have (1) developed judgment necessary for developing and critiquing econometric research designs, (2) learned a wide range of econometric tools for analyzing cross-sectional and panel data, (3) become familiar with various data sources and the practical skills necessary to access and utilize them, and (4) become facile with at least one software package for analyzing and displaying statistical and econometric results.

Prerequisites: Formal prerequisites are 01:220:320 AND 01:220:321 AND 01:220:322, as well as permission from the Department of Economics staff.

This is an honors level class and is intended for students who (i) did well in Introductory Econometrics (grade B+ or higher) and (ii) have a more than passing interest in delving into the finer points of economic analysis by engaging in rigorous theoretical and empirical study. You are not required to be writing a senior thesis in economics to take the class. But the class is required for those writing a thesis. (If the companion course on time series econometrics is more appropriate for your thesis work, see the professor and/or the undergraduate advisor for permission to substitute that course for this requirement.)

Course Website: The course website is on Canvas, where announcements and assignments will be posted. Students should check the website at least several times per week.

Required Text: **Mastering 'Metrics: The Path from Cause to Effect**
Joshua Angrist and Jorn-Steffen Pischke
(2014, Princeton University Press)
ISBN 9780691152844

You should buy or rent a copy of this text by the end of the second week of term.

The style of this book is more discursive than a typical econometrics text. Many will find that more approachable and interesting. Others may prefer the terseness of a standard text. In general, you are encouraged to read multiple discussions of the same topics, both to find the best approach for your learning style and because much can be learned from comparing multiple perspectives.

Supplementary text: **Introductory Econometrics: A Modern Approach**
Jeffrey Wooldridge
Cengage Press

There are 7 editions of the book and are all fine; they do not change too much.

Other Readings: All other readings for the course will be available online, as posted on the course website. If special access is required, you can either get this directly from an on-campus computer or log into the Rutgers Libraries on its homepage.) All readings are required unless stated otherwise.

Econometrics Software: You will need to have independent facility with an econometric software package to complete homework assignments and for your empirical research project. There is no specific required package. That said, Stata and R are the preferred programs for those conducting the analyses covered in this course, which means that user-written programs are generally provided in those two languages. Students have full access to software through the Rutgers virtual computer labs. Information on accessing the Virtual Computer Labs is at: <https://it.rutgers.edu/virtual-computer-labs/> Students using the Virtual Labs can save and access their files if they have set up an account on Box (<https://it.rutgers.edu/2019/03/04/box-storage-service-now-available/>) or OneDrive (<https://it.rutgers.edu/microsoft-office/microsoft-office-for-students/>) Those of you writing theses should consult with your thesis advisor, though, as working in the same software facilitates technical advice.

Your classmates will become terrific sources of technical advice. We will discuss in class during the second week which software programs you plan to use, so think about it before then. Using a package that is used by at least a handful of other students will greatly ease the burden of gaining facility with the software.

Method of Evaluation: Your course grade will be determined as follows (no extra credit assignments). Grades will be maintained on Canvas.

20%	Preparation for and participation in class
15%	Homework (individual and group assignments)
25%	2 in-class midterm exams
25%	Empirical research project (due beginning of last day of class)
15%	Final exam

Attendance & Active Participation: This course requires active participation in discussion and in working through computer exercises. Therefore, consistent attendance is expected. You should be prepared to participate in the activities we do, which means that you prepare assigned readings in advance of class and you are prepared to work on homework and papers during class sessions. Seeking and providing feedback on research by others while it is “in progress” is an important skill that will be honed during these activities.

If you expect to miss more than one or two classes because of illness or a family emergency, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me. You are responsible for catching up on the missed work.

Homework: Over the course of the semester, homework designed to reinforce and extend the concepts discussed in class will be assigned. Due dates will be announced in advance in class and on the course website. Homework must represent the independent work of each student, even if students consult each other for advice. Any group assignments will explicitly allow for collaboration.

Make-up Exams: If you anticipate missing an exam or major assignment due to the observance of a religious holiday, you must notify me by September 20 about those dates. If you miss an exam due to illness or a family emergency, you must contact me within 24 hours of the exam to inform me of your situation. Please e-mail me directly; do not rely on the absence reporting system if you miss an exam. Failure to contact me in a timely manner may result in a grade of zero for the exam.

Academic Integrity: The course will follow university policies on academic integrity. Please review the policy at: nbademicintegrity.rutgers.edu. Any assignment for which you are explicitly allowed to work in groups but told to turn in your write up means that it needs to be written up in your own words and turned in individually. If at any time you are unclear about the procedures for any given assignment, raise the issue in class or via email to the professor. For exams, whether in class or “take home,” you may not use any materials unless explicitly noted. For papers, the libraries’ website on Copyright for Students is useful: www.libraries.rutgers.edu/research-tools-and-services/copyright-guidance/copyright-students.

Recording Policy: Audio visual recording, transmission and distribution of class meetings is forbidden without explicit, prior permission of the professor instructor and notification of other students in the class. This applies to any recordings of class activities. If these are posted for your convenience, for reasons of academic privacy, you are not allowed to download, save, or forward these materials. If you have special circumstances, please communicate with the professor rather than making your own judgments in this matter.

Academic and Personal Support: Please take advantage of university services as appropriate. The Office of Disability Services works with students to determine reasonable accommodations and to facilitate and coordinate those accommodations where applicable. <https://ods.rutgers.edu/>

I understand that many pressures can affect your ability to concentrate and perform work for this course. I am happy to help direct you to resources that may offer support.

If you experience psychological or other difficulties, related to this course or not, please seek support. There are many options available for a range of counseling services. <http://health.rutgers.edu/medical-counseling-services/counseling/>

Rutgers has assembled a list of supports at this website: <https://success.rutgers.edu/>. Students faced with persistent challenges, extenuating circumstances, and emergencies should be encouraged to contact the Dean of Students: <http://deanofstudents.rutgers.edu/>

Here are some links that may be particularly useful:

Student Success Essentials: <https://success.rutgers.edu>

Student Support Services: <https://www.rutgers.edu/academics/student-support>

The Learning Centers: <https://rlc.rutgers.edu/>

The Writing Centers (including Tutoring and Writing Coaching): <https://writingctr.rutgers.edu>

Rutgers Libraries: <https://www.libraries.rutgers.edu/>

Office of Veteran and Military Programs and Services: <https://veterans.rutgers.edu>

Student Health Services: <http://health.rutgers.edu/>

Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services (CAPS):

<http://health.rutgers.edu/medical-counseling-services/counseling/>

Office for Violence Prevention and Victim Assistance: www.vpva.rutgers.edu/

Rough Schedule of Topics (details to be posted on course website)

Week 1: Introduction to applied microeconometrics; regression and causality

Week 2: Regression fundamentals; heterogeneity and nonlinearity; and other details of standard regression analysis (mostly review)

Week 3: Omitted variable bias

Week 4: Applications of multivariate regression; specifying and interpreting interactions, dummy variables, categorical variables

Week 5: Instrumental variables and two-stage least squares

Week 6: Midterm #1; Regression discontinuity designs

Week 7: Data sources and research designs for independent empirical research projects; practical considerations such as re-coding, missing data, attrition

Week 8: Panel data; dealing with unbalanced panels

Week 9: Differences in differences; “pre-trends”; synthetic controls

Week 10: Research designs for independent empirical research projects; presenting results; robustness and sensitivity analyses

Week 11: Midterm #2; Standard error issues in cross-section and panel research designs

Week 12: Limited dependent variable models; presenting results of empirical analyses

Week 13: Presentations of empirical research projects