

ECON 222: Advanced Econometric Techniques and Applications
Spring 2020
Professor Petra Todd

Course Description

Lecture: 12:00-1:20 Tuesdays and Thursdays, EDUC 203

Office Hours: Office hours for Petra Todd will be Thursdays 1:30-3 in PCPSE 606 or by appt. at other times. Our TA (Gabrielle Vasey) will also have office hours. Her email is gvasey@sas.upenn.edu. Her office hours will be Tues 9-10am and Wed 830-930am in room PCPE 500.

Prerequisites: ECON 1, 2, 101, 102, 103, ECON 104
Math 104 and Math 114 (Calculus)
Additional coursework in linear algebra and statistics is also very helpful for this course.

This course introduces undergraduate students to advanced topics in econometrics, with an emphasis on modeling and estimation methods used in microeconomic applications. The course begins with some review of material from the first econometrics course (ECON 104) using matrix algebra notation, including the OLS model with and without heteroskedasticity, errors in variables, and instrumental variables. We then cover methods for handling discrete variables (binary logit, binary probit, multinomial logit) and limited dependent variables, including maximum likelihood estimators. We will also cover nonparametric density and estimation methods. Along with the methods, we will consider many policy relevant applications, including modeling behaviors such as the decision to go to college, to get married, or to work, marketing applications where we predict the demand for goods based on their characteristics, and some applications in evaluating the effects of treatments and social programs.

As part of the course, students will also be required to write programs in the language R. This programming language is widely used to analyze data (in academic and nonacademic settings). R can be obtained for free from the web site

<http://www.r-project.org/>

A brief tutorial for learning R is available on the class piazza website.

Students will be required to write R programs for the purpose of implementing the econometric methods discussed in class and analyzing some datasets. This course satisfies the university's quantitative data analysis requirement.

Readings

The main text for the course is the course notes that will be made available through Piazza, which will be available through Canvas. If you want to buy a reference book in econometrics that is helpful for the course, I recommend the textbook *Econometric Analysis* by William Greene. However, we will not closely follow any text and the purchase of a textbook is definitely not mandatory. Exams will be based mostly material covered in class, so regular class attendance is critical for success in this course.

Grading

4 problem sets:	28%
two midterms:	40%
final exam:	32%

Problem sets will be worth 100 points each. Group work on problem sets is permitted (and encouraged!), although each student needs to hand in a separate assignment. There will be a 10 point penalty for problem sets that are turned in up to a week late and work is not accepted if more than a week late. If a final grade is borderline, class attendance and participation will be taken into account. The dates of the midterms are Feb 27 and April 16.

This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza and to interact there with other students in the class. If you have any problems or feedback for the developers, email team@piazza.com.

Find our class page at

<https://piazza.com/upenn/spring2020/econ222/resources>