

**ECON 222: Advanced Econometric Techniques and Applications**  
**Spring 2017**  
**Professor Petra Todd**

**Course Description**

**Lecture: 10:30-11:50 Tuesdays and Thursdays, McNeil 410**

**Office Hours:** Office hours for Petra Todd will be Wednesdays 10-12 in McNeil, room 520 or by appt. at other times. Our TA (Hanna Wang) will also have office hours that will be announced in class.

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 (logit, probit) 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 applications in evaluating the effects of treatments and social programs.

As part of the course, students will also be required to learn how 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 and on my website <http://athena.sas.upenn.edu/~petra>.

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 that text and the purchase of the text is 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 is permitted (and encouraged!) on problem sets, 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 March 1 and April 5 and the date of the final is May 7.

The T.A.'s name for the course is Hanna Wang. Her office is McNeil 526. Her email is [hannaw@sas.upenn.edu](mailto:hannaw@sas.upenn.edu).

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](mailto:team@piazza.com).

Find our class page

at: [https://piazza.com/upenn/spring2018/srs\\_econ2220012018a/home](https://piazza.com/upenn/spring2018/srs_econ2220012018a/home)