

ECON 311a: Advanced Econometrics I

Spring 2019

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Office hours: M 6:45 pm–7:45 pm; W 2:00 pm–3:00 pm

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Lecture: M&W 12:30 pm–1:50 pm

Lecture location: Sachar Chancellor's Suite

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Office hours: Tu 11:00 am–12:30 pm & 1:30 pm–2:30 pm

Location of office hours: Sachar 11A

Course description: This is the first PhD-level course in econometrics. Topics to be covered include conditional expectations, basic asymptotic theory, ordinary least squares, instrumental variables and control function methods, maximum likelihood, method of moments and generalized method of moments, binary response and panel data models, and treatment effects.

Learning goals: The main goal of this course is to provide you with an overview of a number of important econometric methods that are used in the analysis of cross section and panel data. In the first part of the course, I will provide a relatively formal treatment of the single equation linear model with cross sectional data as well as its estimation using ordinary least squares (OLS) and instrumental variables (IV) methods. This part of the course will also serve as an introduction to some of the formal methods of (theoretical) econometric analysis. In the second part of the course, I will discuss the maximum likelihood and (generalized) method of moments approaches to estimation, also applying maximum likelihood to the estimation of binary response models. In the third part of the course, I will

cover panel data models and treatment effect estimation. The purpose of covering such a wide variety of topics is to provide you with the tools to understand empirical studies in a number of fields of economics—and especially in applied microeconomics fields such as labor, public, development, health, and education. Last but not least, one of the goals of this course is to develop your practical skills; I will rely heavily on empirical applications in Stata and you will be required to use Stata in your homework.

Workload statement: Success in this 4-credit course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, papers, discussion sections, preparation for exams, etc.).

Textbook: The main textbook for this course is *Econometric Analysis of Cross Section and Panel Data* (2nd ed.) by Jeffrey M. Wooldridge. All readings come from this textbook.

Other textbooks that might be helpful:

- *Introductory Econometrics: A Modern Approach* by Jeffrey M. Wooldridge (useful as a refresher of undergraduate-level econometrics)
- *A Guide to Econometrics* by Peter Kennedy (little math, good intuition)
- *Econometric Analysis* by William H. Greene (a comprehensive graduate-level textbook)
- *Econometrics* by Bruce E. Hansen (a comprehensive graduate-level textbook, available online at <https://www.ssc.wisc.edu/~bhansen/econometrics/>)
- *Microeconometrics: Methods and Applications* by A. Colin Cameron and Pravin K. Trivedi (focus on cross section and panel data)
- *Microeconometrics Using Stata* by A. Colin Cameron and Pravin K. Trivedi (applications in Stata)
- *Causal Inference for Statistics, Social, and Biomedical Sciences: An Introduction* by Guido W. Imbens and Donald B. Rubin (treatment effects)

- *Mostly Harmless Econometrics: An Empiricist's Companion* by Joshua D. Angrist and Jörn-Steffen Pischke (focus on treatment effects with economic applications, valuable for applied microeconomics researchers)

Evaluation: There will be an in-class midterm as well as a final exam. No make-up exams will be offered during the semester. If you are unable to take an exam for a legitimate reason, you must obtain advance authorization. I will also assign a total of six problem sets—which you are required to do on your own. Each problem set is due at the beginning of the corresponding class (due dates are given below; these dates are subject to change). No late submissions will be accepted under any circumstances. Your final grade will be calculated in the following way:

Problem sets	—	30% of grade
Midterm exam	—	30% of grade
Final exam	—	40% of grade

Special accommodations: If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me immediately.

Academic honesty: You are expected to be honest in all of your academic work. Please consult Brandeis University *Rights and Responsibilities* for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be found at LTS-Library guides.

Important dates: This is a list of important dates, including the *tentative* date of the midterm exam, a Brandeis Monday, and several Mondays and Wednesdays without scheduled classes:

January 21	—	Martin Luther King Jr. Day, no class
January 22	—	Brandeis Monday, extra class
February 18 & 20	—	Midterm recess, no class
March 11	—	Midterm exam, in class
April 22 & 24	—	Passover and spring recess, no class
TBD	—	Final exam

Also, problem sets are *tentatively* scheduled to be due at the beginning of class on the following dates:

February 4	February 13	March 6
March 27	April 3	April 15

Course outline:

1. Conditional expectations & linear projections
2. Introduction to asymptotic theory
3. Ordinary least squares
4. Instrumental variables
5. Control function approaches
6. Maximum likelihood
7. Binary response models
8. Method of moments & GMM
9. Panel data models
10. Treatment effects