Brown University
Department Of Economics
ECON 2040
Spring 2017

Lectures: TTh 10:30-11:50am (Robinson Hall 301)

Professor: Andriy Norets, andriy_norets@brown.edu
Office hours: M 3:00-4:00pm, 209 Robinson Hall

Course webpage: http://canvas.brown.edu

TA session: TBD
TA: Xu Zhang, xu_zhang@brown.edu

Course objective

ECON 2040 is the second course in the PhD econometrics sequence. It provides an introduction to theoretical foundations of standard econometric estimators: OLS, IV, GMM, MLE, and Bayes. If time permits a brief introduction to nonparametric estimation will be given.

Prerequisites:

Econ 2030 and an undergraduate course in Econometrics.

Readings:

Required text: Fumio Hayashi, Econometrics; denoted by H in a course outline below.

Grading:

Final Exam: 50%
Midterm: 25%

- The midterm will take place in-class on Thursday March 23.

Problem Set(s): 25%

- There will be 6-8 problem sets. You may work with other students on the problem sets, but the answers you submit must represent your own understanding of the solutions. Direct copying is not permitted and will be treated as cheating. We will not accept late problem sets.

Hours:

Over 13 weeks, students will spend 3 hours per week in class (39 hours total), and 1 hour per week in TA session (13 hours). Homework, reading, and studying for the midterm examination will take approximately 8 hours per week (104 hours total). In addition, there is a 3-hour final exam for which approximately 24 hours of review is assumed.

Course Outline:

1. Review and generalizations of standard asymptotic results (LLN, ULLN, CLT, continuous mapping theorem, Slutsky theorem, Delta method); H2.1-2.2 and H6.5.
2. Finite sample properties of OLS estimator: derivation of OLS, distribution of OLS estimator under normally distributed errors and testing, R^2, omitted variable bias and Frish-Waugh theorem; H1.1-1.4
3. Large sample properties of OLS estimator; H2.3-2.6, 2.9
4. GMM for single linear equation, IV, TSLS; H3
5. Extremum estimators, MLE, nonlinear GMM, consistency, asymptotic normality; trinity of tests; H7
6. Bayesian approach to inference: motivation, decision problem formulation, conjugate priors, testing, set and point estimation, asymptotic properties and complete class theorem; lecture notes and Ch 11 in Intro to Math Stat by Hogg, McKean, Craig
7. Brief introduction to nonparametric kernel density and regression estimation (if time permits)

Additional non-required books

1. Prerequisite/background in mathematical statistics: Intro to Math Stat by Hogg, McKean, Craig and Statistical inference by Casella and Berger
2. Econometrics by Bruce Hansen, pdf is freely available on author's website
3. Econometric Analysis of Cross Section and Panel Data by Wooldridge
4. Matrix algebra: (i) Matrix Algebra by Abadir and Magnus, (ii) Matrix Algebra from a Statistician's Perspective by Harville
5. Contemporary Bayesian Econometrics and Statistics by John Geweke;
6. Nonparametric Econometrics by Li and Racine, Introduction to Nonparametric Estimation by Tsybakov
7. Asymptotic Statistics by van der Vaart
8. Theory of Point Estimation by Lehmann and Casella and Testing Statistical Hypothesis by Lehmann and Romano
9. Fundamentals of Nonparametric Bayesian Inference by Ghosal and van der Vaart

(6-9 are for material beyond this course, mostly for students interested in econometrics)