

## ECON7311 MICROECONOMETRICS

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Class Hours: TuTh 10:00-11:15

Course Web: <http://www.utdallas.edu/elearning/>

Section 001

Spring 2017

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Teaching Assistant: TBA

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### Prerequisites

Students must have taken ECON6309 (Econometrics I) and ECON7309 (Econometrics II). Ideally you should have taken ECON6301 (Microeconomics I) as well.

### Course Description

The course covers microeconomic topics such as panel data models, limited dependent variable models, treatment effects, difference-in-differences, structural models, and non-/semi-parametrics. Emphasis is placed on both theory and empirical applications. I expect enthusiasm, curiosity, and eagerness from you.

### Student Learning Objectives/Outcomes

After taking the course, students are expected to: (1) conduct literature review to follow and understand the recent advances in econometrics; (2) understand the necessary econometric software/tools to analyze economic data/models; (3) implement various econometric analyses and interpret the results; (4) communicate the results to peers, professionals, and undergraduate students.

### Required Textbooks

(ACQ2016) *Microeconometrics and MATLAB: An Introduction*, Adams, Clarke, and Quinn, Oxford, 2016.

(B2013) *Econometric Analysis of Panel Data* (5th Ed), Baltagi, Wiley, 2013.

(CT2005) *Microeconometrics: Methods and Applications*, Cameron and Trivedi, Cambridge, 2005.

(H2014) *Analysis of Panel Data* (3rd Ed), Hsiao, Cambridge, 2014.

(W2010) *Econometric Analysis of Cross Section and Panel Data* (2nd Ed), Wooldridge, MIT, 2010.

### Recommended Textbooks

(AP2008) *Mostly Harmless Econometrics: An Empiricist's Companion*, Angrist and Pischke, Princeton University Press, 2008.

(AP2014) *Mastering 'Metrics: The Path from Cause to Effect*, Angrist and Pischke, Princeton University Press, 2014.

(CT2009) *Microeconometrics Using Stata*, Cameron and Trivedi, Stata Press, 2009.

(F2004) *Longitudinal and Panel Data: Analysis and Applications in the Social Sciences*, Frees, Cambridge, 2004.

(L2002) *Panel Data Econometrics: Methods of Moments and Limited Dependent Variables*, Lee, Academic Press, 2002.

(LR2007) *Nonparametric Econometrics*, Li and Racine, Princeton University Press, 2007.

(M2003) *Panel Data Econometrics*, Arellano, Oxford, 2003.

### **Optional Textbooks**

(G2012) *Econometric Analysis* (7th Ed), Greene, Prentice-Hall, 2012.

(GHJ1993) *Learning and Practicing Econometrics*, Griffiths, Hill and Judge, Wiley, 1993.

(H2012) *Statistics with Stata 12*, Hamilton, Duxbury, 2012.

(JD1997) *Econometric Methods* (4th Ed), Johnston and DiNardo, McGraw-Hill, 1997.

(M2001) *Introduction to Econometrics* (3rd Ed), Maddala, Wiley, 2001.

(W2012) *Introductory Econometrics* (5th Ed), Wooldridge, South-Western, 2012.

### **Exams**

There will be two exams. The dates of the exams will be announced in class. There will be no make-up exam. If you miss Exam 1 with an excuse conforming to university regulation, your Exam 2 grade will be applied to the exam you miss.

### **Homework and Project**

There will be homework assignments, including both theoretical and empirical questions, throughout the semester. The due date of each assignment will be announced in class. *No late assignment will be accepted.* There will also be a project and a presentation in class. The details will be available later in the semester (partly depending on the enrollment).

Various software (such as STATA, MATLAB, LIMDEP, R, and GAUSS) will be discussed and demo programs will be provided. Students may choose other statistical software.

## Grading

Assignments	15%
Project	5%
Presentations	5%
Exam 1	35%
Exam 2	40%
Total	100%

Grading Scales:  $\geq 90$  A,  $\geq 80$  B,  $\geq 60$  C,  $< 60$  F. The instructor may adjust the grading scales at his sole discretion.

## UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

**The descriptions and timelines contained in this syllabus are subject to change at the discretion of the instructor.**

# Formula Sheet for ECON7311

This formula sheet will be provided in your midterm and final exams.

## 1 Matrix Algebra

**Trace of a (Square) Matrix:** ( $A$  and  $B$  are square matrices and  $k$  is a scalar)

$$\text{tr}(A+B) = \text{tr}A + \text{tr}B.$$

$$\text{tr}(kA) = k \text{tr}A.$$

$$\text{tr}A' = \text{tr}A.$$

$$\text{tr}(AB) = \text{tr}(BA).$$

**The Kronecker Product:**

$$A \otimes B \otimes C = (A \otimes B) \otimes C = A \otimes (B \otimes C).$$

$$(A+B) \otimes (C+D) = A \otimes C + A \otimes D + B \otimes C + B \otimes D \text{ if } A+B \text{ and } C+D \text{ exist.}$$

$$(A \otimes B)(C \otimes D) = AC \otimes BD \text{ if } AC \text{ and } BD \text{ exist.}$$

$$(A \otimes B)' = A' \otimes B'.$$

$$(A \otimes B)^{-1} = A^{-1} \otimes B^{-1} \text{ if } A \text{ and } B \text{ are non-singular.}$$

**Eigenvector and Eigenvalue:**

$$\text{tr}A = \lambda_1 + \lambda_2 + \dots + \lambda_n.$$

$$|A| = \lambda_1 \lambda_2 \dots \lambda_n.$$

**Matrix Calculus:**

$$\partial a'x / \partial x = a.$$

$$\frac{\partial x' B x}{\partial x} = Bx + B'x$$

$$= 2Bx \text{ if } B \text{ is symmetric.}$$

**Properties of  $P$  and  $Q$  in one-way models:**

- $P' = P$  and  $P^2 = P$ . Same goes for  $Q$ .
- $PQ = 0$ .
- $P + Q = I_{NT}$ .

## 2 Regressions

- Consider the regression model  $y = X\beta + e$  where  $e \sim (0, \Omega)$ .

The OLS estimator is given by  $(X'X)^{-1}X'y$ .

The GLS estimator is given by  $(X'\Omega^{-1}X)^{-1}X'\Omega^{-1}y$ .

You can use the above two formulas in the exams without proving them.