Public Policy 42000: Applied Econometrics I

This course is the first in a three part doctoral introduction to econometrics. The focus of this course is the nature of statistical models of socioeconomic data with a primary focus on linear systems. The course is concerned with the construction and interpretation of models, not estimation. At the same time, the teaching assistants will teach the software package Stata and there will be homework assignments involving actual estimation.

Lectures:

In-person lectures will be given 10:30-11:50.

Lectures are Mondays and Wednesdays with exception of week 1; there will a lecture on Friday October 6.

TA sessions: TBD

Readings: The course is based on lecture notes. William Greene *Econometrics* is assigned as a required text as it is a good compendium of econometric results. Robert Ash and Melvin Gardner, *Topics in Stochastic Processes*, is a deep discussion of the underlying mathematics for many of topics of this course. Other readings will involve scholarly articles.

Grading: We base grades on homework assignments, a midterm exam, and a final exam. The weights are as follows: Final 50% Homework 30% Midterm 20%.

There will be 7 homework assignments. The assignments will be due 10/08, 10/15, 10/22, 10/29, 11/12, 11/19, 12/03 (all Sundays).

Homework: All assignments will receive equal weight. Assignments should be submitted on-line on Canvas and are due at 23:59 pm on Sundays. No late assignments will be accepted.

Exams:

Midterm: October 30

Final: Week of December 4-8 TBA
Office Hours

Professor: Mondays 6:00pm-7pm Central Time, 3035 Keller

TAs: TBD
Topics

**Topic 1: Probability Theory**

Lecture Notes 1: Probability Theory
Ash and Gardner, Chapter 3
Greene, Appendix B.1-B.6

**Topic 2: Statistical Decision Theory**

Lecture Notes 2: Decisions and Data
Greene Sections 16.1-16.2


Topic 3: Models and Identification

Lecture Notes 3: Identification


Topic 4: Linear System Theory

Lecture Notes 4: Linear System Theory

Greene, Appendix A.1-A.4

Topic 5: Linear Statistical Models/Regression

Lecture Notes 5: Linear Regression

Greene, Chapters 2, 3


Topic 6: Time Series

Lecture Notes 6: Linear Structure of Time Series

Lecture Notes 7: Frequency Domain Approach to Time Series

Lecture Notes 8: Vector Autoregressions
Lecture Notes 9: Unit Roots

Ash and Gardner, Chapters 1-3.

Greene, Chapters 20-21.


**Topic 7. Deep Roots**

Lecture Notes 10: Deep Roots


**Topic 8. Simultaneous Systems, Endogeneity, Instrumental Variables**

Lecture Notes 11: Linear Simultaneous Equations Systems
Greene, Sections 8.4, 10.4.


**Topic 9. Functional Data Analysis**

Lecture Notes 12: Functional Data Analysis

