

Northeastern University, Department of Economics
ECNG140: Applied Econometrics
Spring 2006, Monday and Thursday, 6:00-7:30 pm

Contact Information

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Course Overview

What is the effect of an additional year of education on an individual's hourly wage? How does inflation from last year affect unemployment from this year? These are some of the most fundamental questions of economics, and questions which the methods of econometrics attempt to answer. Applied economists rely heavily on the techniques of multiple linear regression; this course will introduce you to this material. Both cross-sectional and time-series topics will be covered, and panel data models will be introduced if time permits.

For those in the Economics Master's program, this course aims to provide you with the basic tools that can be used in an analyst or comparable position. For those in the Economics Ph.D. program, this course will provide the foundation for the more complex material covered in your next econometrics course. Because this course is so fundamental to your career as applied economists, please be prepared to work hard and understand that the work you do this semester will reap rewards in the future!

Emphasis in this course will be on practical applications of ordinary least squares (OLS) as opposed to complex derivations and proofs. In the beginning of the course, we will briefly review the methods of probability and statistics that are applicable to the material we will cover. We then will study the model assumptions, implications, and limitations of the simple and multiple linear regression models. From there, we will discuss model specification and failures of the OLS assumptions.

The textbook for this course is Wooldridge's *Introductory Econometrics with One-Pass* (Ed. 3E, 2006). This text presents material at the advanced undergraduate/basic graduate level and provides a good background of the fundamentals and applications of econometrics. This book also comes with web access to the datasets used in the text, which will be relied upon heavily for problem sets.

For those who would like to do additional reading in econometrics, another useful undergraduate text that focuses on empirical applications is Ramanathan's *Introductory Econometrics with Applications* (2005). Students who plan to do more advanced applied econometrics should also consider purchasing Cameron and Trivedi's *Microeconometrics* and/or Wooldridge's graduate text, *Econometric Analysis of Cross Section and Panel Data*.

Prerequisites

CECNG105 (Mathematics and Statistics for Economists) or equivalent.

The material in this course assumes that students are comfortable with calculus, properties of summations, and probability and statistics at an advanced undergraduate or Master's level course. Students who do not feel comfortable with calculus or the algebraic properties of summations are encouraged to review this material on their own via the appendices in Wooldridge at the start of the semester.

Topics and Readings Outline

1. Review of Probability and Statistics (Wooldridge Appendix B and C)
 - a. Random variables, Expectations, Estimators, Probability Distributions
 - b. Confidence Intervals and Hypothesis Testing
2. The Simple Linear Regression Model (Wooldridge Chapters 1 and 2)
 - a. The structure of data, descriptive statistics, using Stata
 - b. Model assumptions, estimation, properties of estimators
3. Multiple Regression Analysis- Cross-Sectional Data
 - a. Estimation (Wooldridge Chapter 3)
 - b. Inference (Wooldridge Chapter 4)
 - c. OLS Asymptotics (Wooldridge Chapter 5)
 - c. Functional Form, Model Specification (Wooldridge Chapter 6)
 - d. Measurement Error, Omitted Variables Bias (Wooldridge Chapters 6 and 9)
 - d. Binary variables (Wooldridge Chapter 7)
 - e. Heteroskedasticity (Wooldridge Chapter 8)
4. Multiple Regression Analysis- Time Series Data
 - a. Overview (Wooldridge Chapters 10 and 11)
 - b. Serially Correlated Errors (Wooldridge Chapter 12)

Course Requirements**Problem Sets (40%)**

There will be eight problem sets assigned during the semester, four before the midterm, and four after. Altogether, these will make up 40% of your total grade. These assignments are meant to advance your understanding of the practical implementation of OLS, and as such will have an emphasis on computer-based exercises. You will have about one week to complete the problem set once it is assigned. You are encouraged to work in groups, but you must turn in your own copy of the assignment, showing your work where applicable. No late assignments will be accepted.

Exams (60%)

This course will have one midterm and one final exam. The final exam will be comprehensive. Sample problems for the exams will come from the homework assignments, odd-numbered problems in Wooldridge (for which detailed solutions are available on the textbook webpage) and from other examples provided and done in class. The dates of the exams and contributions to your final grade are as follows:

Midterm (Thurs, March 2)	25%
Final exam (Week of April 24)	35%

Grading Policies

Assignments must be turned in on the date they are due, failure to do so will result in a 10% penalty per day they are turned in late. Make-up exams will only be given in extenuating circumstances, please contact me as soon as possible if you will require a make-up exam.

Cheating and/or plagiarism are serious offenses. Be sure to give proper citation if you are using material that is not your own. Anyone caught cheating, even the smallest amount, will receive an F in the course and be reported to the Graduate Academic Standing (GASC) for further disciplinary action. Similar action will be taken for students caught cheating on exams.