

# Econ 482: Econometric Theory and Practice

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## Course Description

Economics 482 introduces you the regression methods for analyzing data in economics. This course emphasizes both the theoretical and the practical aspects of statistical analysis, focusing on techniques for estimating econometric models of various kinds and for conducting tests of hypotheses of interest to economists. The course is largely theoretical, though it includes also hands-on computer work. The goal is to help you develop a solid theoretical background in introductory level econometrics, the ability to read, understand and interpret (and know the limitations) applied economic papers that apply basic econometric techniques.

We will use the statistical software STATA to explain the empirical example. You will also be asked to use statistic software to do some of your problem sets. If you prefer any other statistic software, feel free to use it. For STATA, there are three ways to get access of this software for UW students:

- Purchase in discount price at <https://www.stata.com/order/new/edu/gradplans/campus-gradplan/>.
- CSSCR computer lab at the first floor of Savery Hall.
- UW terminal server: <https://csde.washington.edu/computing/resources/>

## Problem Sets

During the quarter you or your study group of max. 3 students will go over several problem sets which will require you to apply the topics we discuss in class and in the readings. In order to solve the problem sets some amount of math (calculus and a limited amount of statistics) is required. You are encouraged to work in your group on the problem sets. You should write all the names of the group members that participated in your study/problem set on each of the problem sets and your group name. Please write legibly or use a computer.

Grading of the problem sets: One problem set will not be taken into account for the evaluation. The problem set that will be dropped from the evaluation is your problem set that received the least points during the quarter. Generally, problem sets are due in class on the due date. If you or your group misses the deadline, you'll obtain 0 points for the problem set.

## Office Hour

My weekly office hours are Tuesdays/Thursday 2:00pm to 3:30pm, Savery Hall Room 319G. If this time window systematically conflicts with your time schedule, please let me know in class, so that we can find a different time. Also, feel free to email me at hwus@uw.edu for any course related questions.

## Exams

There will be one 110 minute in class midterm exam and one 110 minutes final exam. They are tentatively scheduled for: (a) Midterm Exam: Feb 8 (b) Final Exam: March 13

All exams will be closed book and closed notes. Exams will cover materials from lectures. You can bring a calculator for all exams. It need not be a very advanced calculator: it need only be able to handle arithmetic operations, square roots, and natural logs.

## Assessment & Evaluation

Problem Sets: 25%

Midterm Exam: 35%

Final Exam: 40%

## Course outline

The tentative outline of the course is as follows:

\*\*Read Wooldridge Appendix B and C if you feel uncomfortable with any statistic materials in class.

1. Introduction. (**Reading: Wooldridge Ch1**)
  - What is Econometrics?
  - Why is it Important?
  - What is Causality?
  - What is a Well-posed Question?
  - What kinds of Data are Frequently Encountered in Econometrics?
2. Simple Regression Analysis. (**Reading: Wooldridge Ch2**)
  - Simple Regression Model.
  - Deriving Linear Regression Coefficients.
  - Properties of Regression Model.
  - Goodness of Fit.
  - Assumptions and Properties of Regression Estimators.

3. Multiple Regression Analysis. (**Reading: Wooldridge Ch3**)
  - Multiple Regression Model.
  - Interpretation of a Multiple Regression Equation.
  - Assumptions and Properties of Regression Estimators.
  - Gauss-Markov Theorem.
4. Inference of the Regression Estimators. (**Reading: Wooldridge Ch4**)
  - Sampling Distribution of Regression Estimators.
  - Testing Single Parameter in Regression Model.
  - Testing Linear Combination of Parameters in Regression Model.
  - Testing Multiple Linear Restrictions.
5. Regression Asymptotic. (**Reading: Wooldridge Ch5**)
  - Consistency and Asymptotic normality of Regression Estimators.
  - Large Sample Inference.
  - Alternative large sample test: Lagrange Multiplier Test
6. Functional Form and Selection of Regressors. (**Reading: Wooldridge Ch6**)
  - Issues on Functional Form of Regressors.
  - Goodness-of-Fit and Selection of Regressors.
  - Alternative Large Sample Test: Lagrange Multiplier Test
7. Regression Analysis with Qualitative Information. (**Reading: Wooldridge Ch7**)
  - Single Dummy Explanatory Variable.
  - Multiple Dummy Explanatory Variable.
  - Interactions Involving Dummy Variables.
  - A Binary Dependent Variable: The Linear Probability Model.
8. Regression Analysis with Heteroskedasticity. (**Reading: Wooldridge Ch8**)
  - Consequences of Heteroskedasticity for Regression.
  - Heteroskedasticity-Robust Inference after Regression Estimation.
  - Testing for Heteroskedasticity.
  - Weighted Least Squares Estimation.
9. Regression Analysis with Endogeneity. (**Reading: Wooldridge Ch15**)
  - Consequences of Endogeneity for Regression.
  - IV Estimation of the Multiple Regression Model.
  - Two Stage Least Squares.

## 10. Model Specification . (Reading: Wooldridge Ch9)

- Functional Form Misspecification.
- Proxy Variables.
- Properties of Regression under Measurement Error.
- Missing Data, Nonrandom Samples, and Outlying Observations.

## Statement on Cheating and Plagiarism

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one's grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term "cheating" not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an un-earned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one's own work. Penalties for cheating and plagiarism range from 0 or F on a particular assignment, through an F for the course, to expulsion from the university. The Department will follow University policy in case of academic misconduct. I strongly recommend that you review the Dept. of Economics policy at <https://econ.washington.edu/policy-academic-conduct> Students found to have engaged in academic dishonesty will be subject to sanctions, which range from a disciplinary warning to permanent expulsion from the University, depending on the seriousness of the misconduct.

## Statement on Services for Students with Disabilities

Americans with Disabilities Act (ADA) Accommodations: The University is committed to providing reasonable academic accommodations to students with disabilities. The Disability Services Office provides university academic support services and specialized assistance to students with disabilities. Individuals with physical, perceptual, or learning disabilities as addressed by the Americans with Disabilities Act should contact Disability Services Office for information regarding accommodations. Please notify your instructor so that reasonable effort can be made to accommodate you. If you expect Accommodation through the Act, you must make a formal request through Disability Services Office. <http://depts.washington.edu/uwdrs/>