

# Economics 4818 : Introduction to Econometrics

Spring 2018    Economics 117    TuTh, 11-12:15pm

Instructor: Taylor Jaworski    Email: [taylor.jaworski@colorado.edu](mailto:taylor.jaworski@colorado.edu)

Office: Economics 14C    Office Hours: TuTh 3-4:30pm (or by appointment)

## Description

This course introduces students to regression methods for analyzing data in economics and related fields. We will cover techniques for estimating regression models as well as problems that arise in estimating such models related to inference, specification, and interpretation. The majority of the course will be spent developing the theory for the ordinary least squares estimator; extensions will include panel data methods and difference-in-difference. The goal of the course is to teach the basics of the theory and practice of econometrics as well as provide exposure to estimating econometric models with actual data.

## Course Materials & Statistical Software

There is one required textbook for this course, which are available in the campus bookstore:

? Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*

Additional course materials{including lectures, readings, and assignments{will be made available on [Desire2Learn](#). Students are also **required** to have access to the statistical software Stata/IC. Information on [student pricing](#) is available on the Stata website. Alternatively, computers equipped with Stata are available in Econ 7.

## Grading

*Assignments* (20% total, 5 = 4%): Students are required to complete 5 assignments. Assignments must be submitted through the dropbox on D2L. Assignments will involve mathematical derivations and empirical analysis using Stata. Due dates are listed the course outline below. Complete answers to assignments will be posted on D2L. Emailed assignments will NOT be accepted. Solutions for assignments will be distributed in class.

*Exams* (80% total, 35% midterm + 45% final): There will be an in-class midterm exam on March 1. Solutions for the midterm will be distributed in class. There will be cumulative final exam on Wednesday, May 9, 4:30-7pm.

*Attendance*: While attendance and participation do not figure directly into the course grade, I will take attendance and use it for students who fall close to a letter grade cutoff. I will also refer to attendance for students who later ask for letters of recommendation. Students with perfect attendance will receive one extra credit point.

*Policy on late work and missed exams*: Late assignments will not be accepted. Students who miss the midterm exam for a valid medical reason will have the weight shifted to the final

exam. Students unable to complete coursework for medical reasons must provide written documentation.

### **Office Hours & Email**

I encourage you to attend office hours or to setup a time to meet outside of office hours if the day/time listed above do not work for you. You should come to office hours prepared

01/30 Population versus samples, estimators, large samples  
Wooldridge, appendix C.1-C.4

02/01 Confidence intervals, hypothesis testing  
Wooldridge, appendix C.5-C.6

### Simple Regression Model

02/06 Assumptions of simple regression model, fitted values and residuals, goodness-of-fit  
Wooldridge, chapter 2.1-2.3

02/08 Interpretation of coefficients, functional form  
Wooldridge, chapter 2.4

Assignment #2 due February 8, hardcopy in-class and on D2L by 11:00am

02/13 Unbiasedness of ordinary least squares  
Wooldridge, chapter 2.5a

02/15 Variance of the ordinary least squares estimators, estimating the error variance  
Wooldridge, chapter 2.5b-2.5c

02/20 Extending the simple regression model to two variables  
Wooldridge, chapter 3.1a

Assignment #3 due February 20, hardcopy in-class and on D2L by 11:00am

02/22 Extending the simple regression model to several variables  
Wooldridge, chapter 3.1b

02/27 Midterm Exam Review

03/01 Midterm Exam

### Multiple Regression Analysis

03/06 Deriving and interpreting the multiple regression model  
Wooldridge, chapter 3.2

03/08 The expected value of the OLS estimator  
Wooldridge, chapter 3.3

03/13 The variance of the OLS estimator  
Wooldridge, chapter 3.4

03/15 The Gauss-Markov Theorem  
Wooldridge 3.5

03/20 Sampling distribution of the OLS estimator  
Wooldridge, chapter 4.1

- 03/22 Hypothesis testing (and confidence intervals) for a single parameter  
 Wooldridge, chapter 4.2-4.4  
 Assignment #4 due March 22, hardcopy in-class and on D2L by 11:00am
- 04/03 Large sample properties of the OLS estimator  
 Wooldridge, chapter 5
- 04/05 Functional form, goodness-of-fit in multiple regression  
 Wooldridge, chapter 6.2-6-3
- 04/10 Dummy variables, interaction variables  
 Wooldridge, chapter 7
- 04/12 Heteroskedasticity  
 Wooldridge, chapter 8.1-8.2

### Panel Data

- 04/17 Combining cross-section and time series data  
 Wooldridge, chapter 13.1-13.2
- 04/19 Fixed effects  
 Wooldridge, chapter 14.1

### The Selection Problem

- 04/24 Omitted variable bias  
 Wooldridge, chapter 3.3, 15.1
- 04/26 Regression analysis and quasi-experiments  
 Angrist & Pischke, chapter 2  
 Blake, Nosko, & Tadelis, "Consumer Heterogeneity and Paid Search Effectiveness"
- 05/01 Motivation and setup for the Difference-in-Difference methodology  
 Wooldridge, chapter 13.2-13.5
- 05/03 Application to "What is the impact of immigration on native wages?"  
 Card, "The Impact of the Mariel Boatlift on the Miami Labor Market"  
 Assignment #5 due May 3, hardcopy in-class and on D2L by 11:00am

The Final Exam will be on, **Wednesday, May 9, 4:30-7pm**, which is the date of [final exam scheduled by the University](#).