

Introduction to Econometrics (ECO 4421)

Department of Economics
Florida International University

Instructor: Esteban Chinchilla

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E-mail: Esteban.Chinchilla@fiu.edu

Office Hours: Mon 6.30pm-7.30pm (Zoom)

Tutoring Center: VH-136

Course Description

This course is an undergraduate-level introduction to econometrics. You will study and apply regression analysis to a data set to understand the core concepts of estimating economic parameters, predicting economic outcomes, and statistical inference. The purpose of this course is to enable students to develop a solid understanding of econometric concepts and techniques, and become familiar with statistical software used for economic analysis.

For some of you, this may be the only course you take on the subject. It provides a solid foundation for economic analysis and thinking that can last throughout your education and subsequent professional careers. For others, this class may provide a foundation for many years of research in economics, business, or related fields. Therefore, the goal of this course is for students to learn a set of statistical tools and research designs that are useful in conducting empirical research on diverse topics.

In addition to the exams and homework assignments, students will be assigned an econometrics project. The econometrics project provides students with the opportunity to write an empirical analysis paper on a topic of choice. Hands-on practice with STATA is integrated into the class from the start, and students will learn throughout the course how to use software for data analysis, and how to interpret results.

Course Materials

The **required** textbook for the course will be **Introductory Econometrics: A Modern Approach**, 7th edition, by Jeffrey M. Wooldridge. It can be rented for a reasonable price. We will also use a combination of slides and class notes that will be made available on Canvas.

The following two books are not required for this class, but recommended. A great book for intuition development is **Introduction to Econometrics** by Stock James and Watson Mark. I also recommend **Causal Inference** by Scott Cunningham, 2021.

Prerequisites/Corequisites

Prerequisite: ECO3101, ECO3203, ECO3410, or permission of the instructor. Please note that ECO3101 has as prerequisites MAC 2311 (Calculus I) or MAC 2233 (Calculus for Business), both of which cover derivatives. Basic knowledge of derivatives is expected.

Course Objectives

By the end of this course, you will be able to:

1. Derive the OLS parameter estimates using a single variable and explain how the least squares principle is used to fit a line through a scatter plot of data.
2. Understand the difference between an estimate and an estimator.
3. Define a multiple regression model and be able to derive and interpret the coefficients of the model.
4. Understand and explain the difference between economic and statistical significance.
5. Explain the meaning of heteroskedasticity and be able to compute heteroskedasticity-consistent standard errors for least squares.
6. Be able to include a dichotomous variable on the right-hand and left-hand side of a regression and explain how it affects model interpretation.
7. Conduct economic research project using regression analyses with statistical software

Important Dates

The following are *tentative* exam dates for the course:

Exam	Week	Date
Exam I	Week 6	February 11th (Saturday)
Exam II	Week 11	March 18th (Saturday)
Exam III	Week 15	April 15th (Saturday)

Assignments

- Homework assignments will be given throughout the semester to give you practice implementing topics learned in class, and to prepare you for the econometrics project
- **Late submissions are NOT ALLOWED**

Late submissions, missed exams, and extra credit

Late submissions are NOT allowed, no exceptions.

There aren't any make-up exams.

There aren't any extra credit assignments.

At my discretion, I might implement a mechanism to make up for low grades. This will largely depend on overall class performance, so please don't plan on this being an option.

Econometrics Project

The econometrics project will be an opportunity to apply the concepts learned in class to write an empirical paper on a topic of choice. Students will need to select a topic, formulate a research question, and apply the analytical and quantitative skills acquired in this course to a data set to answer the question.

Your research paper should attempt to make a contribution to the existing literature, such as:

- Add a new variable that hasn't been studied before to an existing model
- Study an existing question with more recent data
- Use a new data set for an existing paper to study a question for a different geography other than the original
- Find a completely new question (hard but possible)

In addition to the empirical analysis, students will have to write a paper on the subject, with the following sections: introduction, literature review, data, methodology, results and analysis, and conclusion.

The project needs to be done in STATA (no exceptions).

Software

This course will rely heavily on the use of STATA for homework assignments and the econometrics project. STATA is designed as a general-purpose statistical package, and has a powerful built-in graphing capability. You can access STATA via [FIU's eLabs](#). Alternatively, temporary and perpetual licenses can be purchased from the [STATA website](#).

We will exclusively be using STATA. Other languages such as Python, SAS, R, etc. are NOT an option for this class.

Important Project Dates

Milestone	Date
Identify topic, question, discuss data set and empirical strategy	February 17th
Discussion on data sources, summary statistics, and discuss at least two related studies	March 10th
First draft of paper	March 29th
Final Paper - submit for grading	April 12th

Grading Policy

All your grades will be posted on Canvas, allowing me to keep you informed on your progress in the course. If you have any questions or concerns about your grade or your performance in this class, please contact me immediately.

Your grade for the course will be determined as follows:

- 20% Exam I
- 20% Exam II
- 20% Exam III
- 15% Econometrics project
- 25% Homework assignments

Grade	Range	Grade	Range
A	100% to 90%	A-	< 90% to 87%
B+	< 87% to 84%	B	< 84% to 80%
B-	< 80% to 77%	C+	< 77% to 74%
C	< 74% to 67%	D	< 67% to 57%
F	< 57% to 0%		

Course Policies

Office Hours

If you have questions, you may ask via email. Regular office hours will be held via Zoom and open to everyone on Mondays between 6.30pm and 7.30pm EST. I will be happy to make an appointment for another time if you wish to discuss something in private. My email address is esteban.chinchilla@fiu.edu

Other Policies

I will NOT approve an offline proctoring center at a non-fiu-approved location. If you intend to take the exam at an offline proctoring center, please make sure it's an FIU-approved location. If you intend to take exams at an offline proctoring center that's not an FIU-approved location, this course is not for you. Please refer to the syllabus on Canvas for additional information and applicable policies.

This syllabus is available to students that are considering taking the class. Upon enrollment, you'll see a copy of the syllabus posted on Canvas. Enrolled students are expected to familiarize themselves with the syllabus on Canvas - that will be the syllabus used for the class.

Course Schedule

Date	Week	Topic	Chapter(s)
9-Jan	Week 1	Math and Statistics review. Introduction to Econometrics. Types of data.	CH01
16-Jan	Week 2	Single variable linear regression and the population regression line. Sample regression line. Introduction to OLS	CH02
23-Jan	Week 3	OLS - continued. Assumptions: Linearity on parameters, and the expected value of the error term. Covariance and correlation	CH02
30-Jan	Week 4	Goodness-of-fit (R-squared). Gauss-markov theorem: OLS is BLUE. The unbiased estimator. Regression through the origin.	CH02
6-Feb	Week 5	Capital Asset Pricing Model (CAPM). Portfolio theory: managing risk. Risk and Return. Types of risk. OLS Measures of portfolio risk.	CH02
13-Feb	Week 6	Review: minimizing SSR. Running a linear regression in stata	CH02
20-Feb	Week 7	Multivariate regression model. Minimization problem. Results interpretation and identification strategy. Additional assumptions for BLUE.	CH03
27-Feb	Spring Break	Spring Break	
6-Mar	Week 8	Statistical inference in regression analysis. Sampling distributions of the OLS estimators. Hypothesis testing.	CH04
13-Mar	Week 9	Qualitative data. Indicator variables. Interaction terms.	CH07
20-Mar	Week 10	Difference-in-differences	CH13
27-Mar	Week 11	The linear probability model. Probit and Logit Models. Marginal Effects.	CH07, CH17
3-Apr	Week 12	Project	
10-Apr	Week 13	Project	
17-Apr	Week 14	Project Due	
24-Apr	Week 15	Finals Week	
