



Prof. Chrystie Burr  
chrystie.burr@colorado.edu  
Economics 4D  
(303)492-0863  
Course D2L site

**Economics 4848-001**  
Applied Econometrics  
MWF, 11:00-11:50  
HUMN 1B45  
Office Hours: Wed 1:30-3:00

### Course Description:

This course is designed to offer you solid foundation in empirical econometrics and experiences in analyzing real life data. Most importantly this course can provide you with critical skills in the *Age of Big Data*. In doing so, we will first review the basic theoretical concepts in probability and statistics in order to understand regression models and hypothesis testings. Meanwhile we will spend a substantial amount of time mastering STATA, a statistical computer software package designed especially for empirical economic analysis. You will learn to use STATA to conduct descriptive and regression analysis using rigorous statistical methods and models.

### Prerequisite(s):

To enroll in the course, you must have completed Economics 3818 or an equivalent course. We will review the necessary math tools with the assumption of prior exposure. Students with a continuing interest in econometrics will find complementary material in Economics 4818 as it provides more depth at the theoretical level.

### Course Materials:

1. Required textbook: *Using Econometrics: A Practical Guide* by A.H. Studenmund. 6<sup>th</sup> Edition (older editions are acceptable as well)

Optional textbook and notes:

Prof. Cadena's Coursepack.

*An Introduction to Modern Econometrics Using Stata* by Christopher Baum

*Microeconometrics Using Stata* by A. Colin Cameron and Pravin K. Trivedi

*Introduction to Econometrics* by James H. Stock and Mark W. Watson.

Online resources:

UCLA Institute for Digital Research and Education

Stata Tutorial by Germán Rodríguez at Princeton University

2. Additional lecture notes will be posted on the course website.
3. Students are not required to purchase their own copies of STATA. You can access STATA in the computer lab in the basement of the Economics building (Econ 6) or the Norlin Statlab (Norlin M350). Note that the Econ building is closed on weekend but remains open until

10pm on weekdays. The library lab is open some hours on the weekend with details on the OIT website. Those who are interested in purchasing a personal copy can go through the University's GradPlan website in order to receive a substantial discount (starting at \$69). Among the different versions that are available, Stata/IC is sufficient for the requirement of this course.

## Course Objectives:

At the completion of this course, students will be able to:

1. Be familiar with basic probability and statistical terms and models.
2. Conduct regression analysis on real-life data in a meaningful way.
3. Understand the power and the limits of regression analysis.
4. Diagnose the imperfection in the data set by using statistical tests.
5. Construct hypothesis and use proper statistical testing to "accept"/reject the hypothesis.
6. Demonstrate the ability to conduct meaningful economic research by a) proposing research question(s) b) acquiring necessary data (c) analyzing data (d) interpreting the results from (c) to address (a).

## Grade Distribution:

| <u>Assignment</u>                 | <u>Weight</u> | <u>Due Date</u>   |
|-----------------------------------|---------------|---|
| Attendance & Course participation | 10%           |   |
| Midterm Exam 1                    | 15%           | Wed., Feb. 12 (tentative)   |
| Midterm Exam 2                    | 15%           | Wed., Mar. 19 (tentative)   |
| Research Paper & Presentation     | 30%           | Mar. 11: proposal due (15%)<br>Apr. 18: paper draft due (10%)<br>Apr. 21 - Apr. 30 in-class presentation (25%)<br>5pm, May 2: final draft due (50%) |
| Final Exam                        | 30%           | <u>Tue., May 6 (7:30pm-10pm)</u>  |

## Course Policies:

### • General

- Attendance is critical to succeed in this class. In order to incentivize you to do so, regular attendance will be taken. Together with in-class participation, this will contribute to 10% of the final grade.
- The deadline to drop the course with no record and at no cost is 11:59pm on Jan. 29. You can drop the course from MyCUInfo with a 'W' on the transcript between Jan. 30 to Mar. 21. After that, it requires signature from both your instructor and the Dean.
- All exams are closed book, closed notes.

### • Homework

- Students will regularly work on in-class exercises to practice course material while no graded take-home homework will be given.

### • Exams

- There will be two midterms and a final exam. The first midterm is scheduled to be on Wednesday, February 17 and covers the material up to that point. The second midterm which is scheduled on Wednesday, March 19 and covers the materials after the first midterm up to that point. The final exam is *comprehensive* and is scheduled for Tuesday, May 6 from 7:30pm to 10:00pm.

- **Research Project**

- One of the main goals of this class is to train you to be able to perform original economic analysis of the data. To this end, you will need to complete one independent research project using the skills that you will learn throughout the course. You may work with a partner, but no more than two people may work together. There are three stages of the project. 1) Research proposal (due on March 11) the provides the research question, data source and research design. Failure to turn in the proposal will lead to a 15% penalty on the final project grade. During the last two weeks of April, each group will give a 10-15 minutes presentation of your work. This will help you to gain feedback from me and your classmates so that you can improve your paper before submitting your final draft. The presentation counts for 25% of the final project grade. The final draft is due on Friday, May 2 by 5pm (Either electronic copy or hard copy in my office is accepted).

## **Additional Notes and Policies:**

### **Academic Integrity**

In addition to skills and knowledge, your University education also aims to teach students appropriate Ethical and Professional Standards of Conduct. Detailed policies can be found on the University website. All incidents of academic misconduct will be reported to the Honor Code Council. All work and ideas should be properly cited. Any type of plagiarism when discovered defaults to a failing grade in this course. The bottom line: When in doubt, DO WITHOUT !

### **Special Accommodations:**

If you require special accommodation because of disability, please submit a letter from Disability Services in a timely manner (at least two weeks before the exams or other due dates). Disability Services determines accommodations based on documented disabilities. You may contact Disability Services at 303-492-8671 or b email at dsinfo@colorado.edu

If you have a temporary medical condition or injury, see Temporary Injuries for guidelines and discuss your needs with your professor.

### **Missed Exams**

Make-up exams for the midterms will not be given. Midterm exam absences will only be excused for compelling circumstances (family emergencies or documented illness), in which case the other course material will be re-weighted. Students anticipating conflict with an exam due to religious observance or over-scheduling (3 or more exams on the same day) should bring these to my attention within the first 3 weeks of class.

## Topics to be covered (tentative):

- Intro & Review
  - Unit 1: Introduction to quantitative economic researches
  - Unit 2: Review of probability and statistics
  - Unit 3: Introduction to Stata
  - Unit 4: Descriptive and graphic analysis with Stata
  - Unit 5: Confidence Interval & Hypothesis Testing
- Regression Analysis
  - Unit 6: Overview of regression analysis (Ch. 1)
  - Unit 7: Ordinary least square (OLS) (Ch. 2)
  - Unit 8: Bivariate correlation & Bivariate regression model(Ch. 2.1)
  - Unit 9: Multivariate regression model (Ch. 2.2)
  - Unit 10: Steps in applied regression analysis (Ch. 3.1)
  - Unit 11: The classical OLS model assumptions (Ch. 4.1)
  - Unit 12: Regression Diagnostics - How to deal with imperfect data
  - Unit 13: Functional form specification (Ch. 7)
  - Unit 14: Omitted variable problem (Ch. 6.1)
  - Unit 15: Multicollinearity (Ch. 8)
  - Unit 16: Serial correlation (Ch. 9)
  - Unit 17: Heteroskedasticity (Ch. 10)
  - Unit 18: Dummy dependent variables (Ch. 13)
- Data Management
  - Unit 19: Working with IPUMS data and Running your own regression project (Ch. 11)
  - Unit 20: Merging data sets



*“Live as if you were to die tomorrow. Learn as you were to live forever.”*

— Gandhi