Prof. Chrystie Burr	**Economics 4848-001**
chrystie.burr@colorado.edu	Applied Econometrics
Economics 11	TTH, 11:00-12:15
(303)492-0863	HUMN 1B45
Course D2L site	Office Hours: TH 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. <u>Recommended textbook</u>:
   Introduction to Econometrics by James H. Stock and Mark W. Watson. 3$^{\text{rd}}$ Edition.
   <u>Optional textbook and notes</u>:
   Prof. Cadena's Coursepack.
   An Introduction to Modern Econometrics Using Stata by Christopher Baum
   Using Econometrics: A Practical Guide by A.H. Studenmund. 6$^{\text{th}}$ Edition.
   Microeconometrics Using Stata by A. Colin Cameron and Pravin K. Trivedi
   <u>Online resources</u>:
   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 remins open until

9pm 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, you 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. Diagnosis 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:

Assignment	Weight	Due Date
Attendance & Course participation	10%	
Homework	15%	
Midterm Exam	15%	Thur., October 16 (tentative)
Research Paper & Presentation	30%	Nov. 10: proposal due (15%)
		Dec. 1: paper draft due (10%)
		Dec. 2 - Dec. 11 in-class presentation (25%)
		5pm, Dec 15: final draft due (50%)
Final Exam	30%	Tue., Dec 16 (4:30pm-7pm)

Course Policies:

- **General**

  - Attendance is critical to succeed in this class. In order to incentivize you to do so, attendance will be taken. This will contribute to 10% of the final grade. You are allowed to miss two classes in the entire semester. Once beyond the two absence, you will receive a zero for the attendance grade.

  - Due to the strong demand for this course, you will have to attend every class for the first two weeks to avoid being dropped from this course. You will be able to add yourself back to the waiting list for this class however.

  - The deadline to drop the course with no record and at no cost is 11:59pm on Sept. 10. You can drop the course from MyCUInfo with a 'W' on the transcript between Sept. 10 to Oct. 31. After that, it requires signature from both your instructor and the Dean.

  - All exams are closed book, closed notes.

- **Homework**

  - There are three take-home problem sets. You are encouraged to work independently since you need to know how to solve problems and run regressions on your own during the exams.

- **Exams**

  - There will be one midterm and a final exam. The first midterm is scheduled to be on Thursday, Oct. 16 and covers the material up to that point. The final exam is *comprehensive* and is scheduled on Dec. 16 from 4:30 pm to 7:00 pm.

- **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 Nov. 10) the provides the research question, data source and research design. We will have individual project meetings during the week of Nov. 10. Each group will have 15-20 minutes to discuss the research project with me using the research proposal as the basis. Failure to turn in the proposal or show up to the meetin will lead to a 15% penalty on the final project grade. During the first two weeks of December, each group will give a 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 Monday, Dec. 15 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 (Ch. 1)
    - Unit 2: Review of probability and statistics (Ch. 2 & Ch. 3)
    - Unit 3: Confidence Interval & Hypothesis Testing (Ch. 3)
    - Unit 4: Introduction to Stata
    - Unit 5: Descriptive and graphic analysis with Stata

- Regression Analysis

    - Unit 6: Overview of regression analysis
    - Unit 7: Ordinary least square (OLS) (Ch. 4)
    - Unit 8: Bivariate correlation & Bivariate regression model
    - Unit 9: Multivariate regression model
    - Unit 10: Steps in applied regression analysis
    - Unit 11: The classical OLS model assumptions (Ch. 4)
    - Unit 12: Regression Diagnostics - How to deal with imperfect data
    - Unit 13: Functional form specification
    - Unit 14: Omitted variable problem
    - Unit 15: Multicolinearity
    - Unit 16: Serial correlation
    - Unit 17: Heteroskedasticity
    - Unit 18: Dummy dependent variables

- Data Management

    - Unit 19: Working with IPUMS data and Running your own regression project
    - Unit 20: Merging data sets

"Live as if you were to die tomorrow. Learn as you were to live forever."

— Gandhi