

# Economics 4848 Applied Econometrics

## Summer Session B

Professor J. Klein  
Office: ECON 04A  
Office Hours: M, T, Th 11:00am-12:45pm or by appointment/email  
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## Course Description

Applied Econometrics provides an overview of econometric techniques commonly used in applied research in microeconomics. Methods and topics covered in this course will help students develop a deeper understanding of econometrics as well as learn to use STATA, a statistical software package commonly used in economics. Learning to use STATA will take a significant amount of time and effort but will be extremely valuable as it is much more powerful than what you can do in Excel, EViews, etc. Students will apply the econometric models using data from the US Census Bureau and other sources. In addition, students will be able to apply these skills to a research topic of their choosing.

Typically each week we will discuss the theory for the current topic and then spend some time working with data to apply the theory in STATA. This data analysis that we do in class will be similar to your assignments, however the theory portion will also be covered on exams.

## Prerequisite

This class requires previous completion of Economics 3818, Intro to Statistics, or the equivalent.

## Course Materials

There is no required text but you may find the following resources helpful:

- Introductory Econometrics: A Modern Approach by Jeffery M. Wooldridge
- Using Econometrics: A Practical Guide by A.H. Studenmund
- Prof. Brian Cadena's Econ 4848 Course Pack (available for purchase from the bookstore)

*Software:* We will be learning to use a statistical software program called STATA in class. For all assignments, projects, and exams you will be required to complete all analysis using STATA. Students are not required to purchase their own copies of STATA, as it is available in the computer lab in the basement of the economics building. Note that the economics building is closed on weekends, but remains open until 10pm on weekdays. If you choose not to buy Stata, please plan your work time accordingly. No late assignments will be accepted because you could not access the computer lab on the weekend. Stata is also available in the Benson computer lab.

You can find a list of other campus labs with STATA at: <http://webdata.colorado.edu/labs/softwaresearch/>

If you choose to purchase your own copy of STATA, it will allow you to work on assignments and your research project outside the computer labs. Students can receive a discount on the software through Stata's GradPlan. Information is available at: <https://www.stata.com/order/new/edu/gradplans/student-pricing/> I would suggest Stata/IC license which is \$45 for 6 months.

*Hardware:* You will need a USB memory device to store copies of data and log files from our work in class.

## Grade Breakdown

Grades for this course will be based on the following criteria:

- Assignments (15% total)
- 2 Exams (30% each)
- Data project and presentation (25%)

Final grades will be determined by your cumulative performance at the end of the semester, and this may or may not correspond to the typical ten-point grading scale (A's are 90-100, B's are 80-89, etc.) If the final distribution of grades are lower than expected, I reserve the right to change the grading scale at that time.

**Assignments (15% total):** Students may work alone or with **one** other student. If you work with a partner please upload one assignment for both of you. These assignments will be similar in content to the lab activities we do in class. Assignments must be uploaded on Canvas by 10:00pm on the day they are due. No late assignments will be accepted for any reason. Your lowest homework assignment will be dropped from your overall score for the course. For each assignment you should upload a .do file with your code, and a Word document or PDF of your answers to the questions. It is your responsibility to check and ensure the documents have been uploaded successfully. *Note that I cannot read .pages files, so these must be saved as a PDF.*

**Exams (30% each):** Exams will be held on July 23 and August 5 during the regularly scheduled class time. The exams will be similar to your homework assignments in that you will be given some data to analyze with accompanying questions and a few theory based questions. Given the nature of programming in STATA and this course, all exams should be considered "cumulative" in the sense that you will need to know how to any and all of the tasks we've learned throughout the semester.

**Students must take exams at scheduled times so ensure now that you can attend class the dates of the exams.** Exams may not be taken early/late and no make ups are given. Exam scores will not be dropped due to poor performance or lack of preparation.

Students with documented disabilities who may need academic accommodations should speak with me during first three weeks of the class. Also contact the Disability Services Office, Willard 322 (phone 303-492-8671).

**Data Project and Presentation (25%):** Students may work alone or with **one** other student on a data analysis project applying what you've learned in the course. Assignments are due at 10:00pm unless otherwise noted. Your written project is due by **10:00pm on Sunday, August 11th**. Your project should pose a testable economic question that can be answered using one of the techniques we discuss in applied econometrics. A sample outline of what to include in your project: Introduce your research question and why it is an important topic to study, citing any relevant sources. Describe the data and empirical technique(s) you use. Conduct one or more types of empirical analysis on your data using techniques from the course. Discuss and interpret your empirical findings. (Roughly 8-10 pages, double-spaced, including figures and tables.)

Your research question must be something that can be answered using the individual level data that is available in either the US Census Bureau's American Community Survey or the Current Population Survey. We will spend time in class on what is available and how to extract and build your data set from the data repository IPUMS where these surveys are stored. This data source is **required** to be used by all students unless given special permission by the instructor.

As part of your grade for the project, a project proposal will be due on **July 20**, your cleaned data set will be due on **July 25**, and your preliminary analysis will be due on **July 31**. Individual meetings will be scheduled on August 2nd, in lieu of regular class. In addition, each student/group will give a presentation on August 8-9th discussing their research question, data, methods, and results. Both students must present part of their project if working in a group.

Your overall grade for the final project will be determined as follows: Project Proposal (10 points), Data set submission (10 points), Initial Data Analysis (15 points), Presentation (20 points), Final Paper (40 points), Corrections to Previous Assignments (5 points)

## Additional Policies

**Attendance:** *Attendance is an absolute necessity in this course.* It is where I can help guide you in learning STATA and completing a good research project, and you can get feedback on where improvement is needed. Students are expected to be in attendance **on time** for every class, as it may be difficult for you to make up the material and fully understand programming in STATA otherwise. It is your responsibility to obtain any material/notes from a class you miss from one of your classmates. Attendance will be recorded every class period and any student missing more than **4 class periods will automatically fail the course**. These absences up to 4 are intended to cover any manner of reasons why you might need to miss class, valid or otherwise. Given the fast pace of a summer course this would be equivalent to missing 4 weeks of a regular semester class. These penalties are **non-negotiable**. Those arriving late, leaving before class is dismissed, or spending significant time on non-class activities will also be counted as absent.

**Disability Accommodations:** If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at

303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or injury, see Temporary Medical Conditions under the Students tab on the Disability Services website and discuss your needs with your professor.

**Religious Observances:** Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or required attendance.

**Honor Code:** All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273) and will result in a failing grade for the course. Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at the [Honor Code Office website](#). This misconduct includes, but is not limited to: Represent the work of others as their own, Use or obtain unauthorized assistance in any academic assignment, Give unauthorized assistance to other students, Modify, without instructor approval, an examination, paper, record, or report for the purpose of obtaining additional credit, Misrepresent the content of submitted work.

**Sexual Misconduct, Discrimination, Harassment, and/or Related Retaliation:** he University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CUs Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulders Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the [OIEC website](#).

**The Office of Victim Assistance** can be reached at 303-492-8855. Its website is: .

**DACA Students:** The webpage [contains](#) information regarding campus counseling resources available for students and employees with DACA Status.

**Classroom Behavior:** Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age,

disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.

Since the course is in the computer lab, I realize that there can be the temptation to work on other things during lecture, browse the internet, etc. However, as a courtesy to me and your classmates, as well as to ensure you understand the presented material, I ask that during lectures (non-lab activities) you only use the computers to follow along with the slides and not for any other purpose. We will often also have practice lab activities that are intended to reinforce the analysis techniques that you will need for your homework.

The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127.

## Tentative Class Schedule

Week	Content	Assignments
Week 1	<ul style="list-style-type: none"> <li>• July 9: Course Information, ACS/CPS Introduction</li> <li>• July 10: Statistics and Sampling</li> <li>• July 11: Introduction to STATA, Creating Variables</li> <li>• July 12: Creating Variables, Data management</li> </ul>	Homework 1 Due 7/12
Week 2	<ul style="list-style-type: none"> <li>• July 15: Exploring Continuous Data, Categorical Data</li> <li>• July 16: Bivariate Regression, Project</li> <li>• July 17: Distribution of <math>\hat{\beta}</math>, Hypothesis Testing</li> <li>• July 18: Goodness of Fit</li> <li>• July 19: Multivariate &amp; Non-Linear Regression</li> </ul>	Homework 2 Due 7/17 Proposal Due 7/20
Week 3	<ul style="list-style-type: none"> <li>• July 22: ACS/CPS Tutorial, Review</li> <li>• July 23: <b>Exam 1: Up to July 19</b></li> <li>• July 24: Categorical Variables in Regressions</li> <li>• July 25: Interaction Models</li> <li>• July 26: Limited Dependent Variables</li> </ul>	Homework 3 Due 7/21 Data Set Due 7/25
Week 4	<ul style="list-style-type: none"> <li>• July 29: Omitted Variable Bias</li> <li>• July 30: Multicollinearity, Heteroskedasticity</li> <li>• July 31: Panel Data</li> <li>• Aug 1: Fixed Effects Model</li> <li>• Aug 2: Individual Meetings</li> </ul>	Homework 4 Due 7/28 Homework 5 Due 7/30 Analysis Due 7/31
Week 5	<ul style="list-style-type: none"> <li>• Aug 5: <b>Exam 2: up to Aug 1</b></li> <li>• Aug 6: Time Series Topics</li> <li>• Aug 7: Time Series/Project</li> <li>• Aug 8: Presentations</li> <li>• Aug 9: Presentations</li> </ul>	Homework 6 Due 8/7 Presentation Due 8/8 at 8:30am Final Paper Due 8/11 at 10pm