University of Colorado at Boulder
Department of Economics

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ECON 8848: Applied Microeconometrics, Spring 2018
Syllabus and Schedule
Office Hours: T/Th 10:45 AM-12:00 PM
Economics 208D
Other times by appointment

Course Description:

Students who are successful in this course will be well prepared to conduct empirical research across a broad range of fields, although the tools are used most frequently in the applied microeconomics fields. The course provides a "user's guide" to many of the most commonly used econometric techniques, with a heavy focus on implementation and interpretation. We will begin the course with a STATA boot camp, quickly becoming familiar with the software package including programming techniques and data management skills. We will then move through a range of econometric topics, making sure to practice each technique in STATA. I hope to live up to the following quotation by Edward Leamer in his article *Let's Take the Con out of Econometrics* (AER, 1983):

> *"Methodology, like sex, is better demonstrated than discussed, though often better anticipated than experienced."*

Prerequisites:

To enroll in this course, you must have a working knowledge of statistics and econometrics equivalent to that obtained in ECON 7818 and ECON 7828.

Course Materials:

There is no required textbook for this course, although I will provide references to a number of books and articles for the interested student. We will also read and discuss several articles. Some of these articles will be "theory" articles, discussing the relative merits of estimators or developing and applying new ones. Others will be "application" papers, usually papers that use a technique we have discussed in an honest and useful way. I will also provide lecture notes, and you will find these and the assigned articles posted or linked on the Desire2Learn website. You should read the articles assigned prior to coming to class and be prepared to answer questions and participate in discussions. Please bring a copy (paper or electronic) of the papers we are discussing with you to class.

Students are not required to purchase their own copies of STATA, although those desiring to do so qualify for a substantial discount through the University's GradPlan. More information is available through a link posted on the Desire2Learn website. I recommend starting with Stata/IC. The price is $198 for a perpetual license (one that never expires).

You will receive a copy of the STATA documentation in PDF format if you choose to purchase your own. If you expect to use STATA beyond this course, you may purchase a more advanced copy (SE or MP), but the Intercooled version will allow you to complete all the requirements of this course.

I will use STATA during some lectures to demonstrate estimators and methods that we cover. If you have STATA installed on a laptop, you may find it useful to bring on those days, although I will provide the code through the course website for review after class.

Requirements and Grading:

Your grade will depend on your performance on a number of assignments, according to the table below:

Assignment	Weight	Due Date
Problem Sets	15%	Every 1-2 weeks (~10 total)
Paper Replication/Extension	30%	Tuesday, 5/8 7:00 PM (Final exam slot)
First Midterm	25%	Thursday, 3/15 In Class (tentative date)
Second Midterm	30%	Thursday, 4/26 In Class

Problem Sets will be posted at the onset of the course with deadlines every 1-2 weeks. These problem sets will allow you to gain direct experience with all of the econometric techniques we cover. All assignments will be STATA-based, although they will require answering interpretation/"thinking" questions as well. These problem sets will not require proofs; rather, they will ask you to simulate or to demonstrate a particular property using real-world or simulated data. Five percentage points of your overall grade will be based on whether you complete the assignments and turn them in on time. I will also choose two assignments at random to grade in depth, and these grades will account for the remainder of your grade. Note that the problem sets are fairly short and simple to start and become more difficult as we tackle more complicated material. You may work with other students on these assignments, and the code may be identical to other students' submissions. To eliminate the temptation to free ride, each student must submit his/her own copy of the problem set (via D2L), and you should indicate each of your collaborators on each problem set.

Each student must answer the "thinking/interpretation" questions separately, although you may discuss the answers with other students. It is expressly forbidden to copy and paste answers to these questions from another student, and any evidence that this occurred will result in a penalty of, at a minimum, zero credit for that assignment.

Paper Replication/Extension: Unlike the harder sciences, the field of economics has historically placed a relatively small weight on the value of replication (although this is changing somewhat). Nevertheless, economists make mistakes all the time, and some of them go undiscovered forever. So, as a means to practice all of the skills we are developing, and in service of the broader good, you will replicate the central analysis of a paper in a field that is of interest to you. You should choose a published paper that relies on publicly available data or on data that the authors have made freely available. The paper's central methodology should be one of the methods we cover in this course. You should also provide at least one extension to the original work. Possible extensions include adding additional years of data, running additional specifications (e.g. functional form, RD instead of DiD, etc.), and subjecting the results to additional robustness checks. Alternatively, you could use similar methods in a slightly different context – different geography, different time period, etc. A paper is not suitable as a replication paper if you cannot feasibly extend the paper.

This assignment will function as our final exam. A hard copy of this paper will therefore be due in my office by the end of our assigned time from the Registrar (Tuesday May 8, 4:30-7:00 PM). I will also ask for an electronic copy so that I can submit the paper to TurnItIn.

Note that although this assignment requires the replication of the central analysis from a published paper, you *may not borrow any language from the original paper without proper citation.* I will require that you complete and attach the department's academic integrity cover sheet for the assignment.

http://www.colorado.edu/Economics/graduate/AcademicIntegrityAgreement.pdf

The First Midterm will cover material from the beginning of the course through lecture on March 13. The exam will take place during a normal class meeting. You *will not* have to do any STATA programming for the midterm. Instead, the questions will focus on the interpretation and implementation of techniques we have discussed. The questions will thus be very similar to the interpretation questions asked on the problem sets. You may also be asked questions about the papers that we read.

The Second Midterm will be nominally cumulative, but it will focus heavily on material covered after the first midterm. It will be similar in format to the first midterm, and it will take place during our normal lecture time in the penultimate week of classes.

Final Letter Grades will be a weighted average of each of the components listed above. Prior to averaging, I will assign letter grades to each component based on the scores a good student at this level could reasonably be expected to attain.

Writing: Please note that this course requires a great deal of writing. The goal of the course is to prepare you to conduct and *to write about* original research in applied microeconomics. As you will soon find, the writing and communication components of applied econometrics are at least as important as the actual econometric skills. In grading papers, exams, and problem sets, I place substantial weight on students' ability to communicate their understanding and interpretation of the methodologies and results. I do so in order to mirror the degree to which the discipline will reward these skills, especially in the job market process.

Seminar Series: You are strongly encouraged to attend the Economics department seminar series, especially when the speaker presents on an empirical applied micro topic. Learning to conduct and present original research is the key to your success in the discipline. These seminars are an excellent resource for you in that endeavor.

Late Assignments/ Missed Examinations Policy: Problem Sets will be turned in through the Desire2Learn website where they will receive a time stamp. All of the problem sets will be posted on the first day of class, and each will be due on a Friday by 5 PM. Following a 5-minute grace period, I will assign zero credit toward the "completion" component of the Problem Set grade for any assignment turned in after the deadline. In the event that a late problem set is randomly selected to be graded in detail, I will deduct 1 point (out of 5) for each half day it is late, and assignments submitted more than 48 hours after the due date will receive no credit.

The paper replication must be turned in by the end of our assigned Final Exam time from the registrar. Following a ten minute grace period, I will apply at least a 15 percent penalty to final projects turned in after the deadline, with greater penalties likely for delays of more than 24 hours.

If you miss either midterm exam you will receive no credit unless you provide documentation of a medical or family emergency. In the case of a documented emergency, the missed exam will be given no weight in the calculation of the final grade and other assignments will be reweighted accordingly. There will be no make-up exams. If you foresee any conflict that will prevent you from taking an exam, please let me know as soon as possible and at least two weeks beforehand.

A note on my role: I am willing to offer you assistance with any assignment for this course, including the final paper. I will strongly suggest, however, that you form study groups for the problem sets and use the other members of your group as your initial resource in solving programming problems. I will not tell you how to solve specific coding issues on the problem sets, nor will I tell you whether you have answered interpretation questions properly prior to the due date. Solutions will be provided shortly after the deadline to turn in the assignment.

I generally cannot offer help on projects that are unrelated to this course, e.g. work you are doing as part of your dissertation or as an RA for other faculty members. My goal in offering this course is to create a critical mass of well-trained graduate students who can then continue to learn more on their own and then serve as a resource to each other.

Cheating: If you copy interpretation answers from a classmate (or previous student) on a problem set, you will receive no credit for that problem set. If you cheat on an exam, you will fail that exam. If you plagiarize even a portion of your final project, you will fail the final project. I reserve the right to impose harsher academic sanctions up to and including failing the course for any instance of cheating. Also, note that failing any component of the course makes it very unlikely that you will earn a “B” or better in the course.

Tentative Schedule

Topic	Tentative Dates
Introduction and STATA Basics	1/16, 1/18
Advanced STATA	
Descriptive Statistics, Figures and Tables	1/23
Programming – Loops, Macros	1/25
Simulation	1/30
Linear Regression Review	
Functional Forms – Logs, Polynomials, Categorical Variables, Interaction Models	2/4, 2/6
Review of FWL and the meaning of "controlling for"	2/8
The Experimental Ideal	
Treatment Effects – Potential Outcomes Framework	2/13
Causality in an OLS Regression – the CIA	2/15
Propensity Score Methods	2/20
Advanced Data Management	2/22
Panel Data Models	
Difference-in-Differences	2/27, 3/1, 3/6 – papers
RE, FE, FD	3/8, 3/13 – paper(s)
FIRST MIDTERM EXAM	3/15
Variance Estimation in Panel Models	3/20 – paper
Instrumental Variables	
Basics – Constant Treatment Effects	3/22
Spring Break – NO CLASS	3/27, 3/29
Local Average Treatment Effects	4/3, 4/5 - paper
NO CLASS – Individual Meetings	4/10, 4/12
Regression Discontinuity	4/17, 4/19 – paper
Binary Dependent Variables	4/24
SECOND MIDTERM EXAM	4/26
Wrap-Up	5/1, 5/3
FINAL EXAM slot (Replication paper due)	Tuesday, 5/8 4:30-7:00 PM

Other University Policies:

Disability Accommodation
If you qualify for accommodations because of a disability, please submit to Prof. Cadena a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu.

f you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with Prof. Cadena.

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. In this course, please inform me no later than two weeks prior to any conflict you foresee, sooner if possible, so that we may find an alternative arrangement for you to complete the requirements of the course. See campus policy regarding religious observances for full details.

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.

Discrimination and Harassment

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. 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.

Academic Integrity

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, 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). 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 honorcode.colorado.edu.