Economics 4818 – Introduction to Econometrics – Spring 2016

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Course objectives. Econometrics is the primary tool of empirical analysis in economics. The field of econometrics combines principles of probability and statistics, economic theory, and data to test theoretical propositions and estimate relations among economic variables.

The first goal of this course is to enable you to understand and critically evaluate empirical studies in economics. Although we will not have time to get into advanced econometric procedures that you might encounter in some economics journals, you should still be able to interpret the estimation and test results that are common across most applied econometric studies. You will also be trained to look for common pitfalls or flaws in econometric analysis, such as a failure to control for confounding factors or a violation of key assumptions of regression analysis. Meeting this goal will require mastery of some fundamentals of probability and statistics and the application of these principles in regression analysis.

Second, you will learn how to conduct valid empirical analysis that is supported by principles of econometric theory. I do not believe that one can learn econometric methods (theory) without practice with applications. Econometric theory establishes when estimators are flawed, but only with empirical examples can we see the types of false conclusions that might be drawn without proper attention to the assumptions of the regression model. Similarly good empirical work requires an understanding of econometric theory. For example, econometric theory establishes the conditions for unbiased estimation or for valid tests of hypotheses. Therefore, in this course you will learn basic econometric theory and also how to estimate empirical models and perform tests of hypotheses with computer applications.

Teaching Philosophy. Most of economics is common sense, and this is true of econometrics as well. In class we will derive formulas or prove various propositions, but every derivation or proof has an intuitive basis. It is important to know the derivations, but it is equally important to understand the logical reasoning behind any proposition we prove. You should be able to explain to your roommate, with no background in statistics, most of the results that we derive in this course. This is the true test of your understanding of the principles of this course, and some exam questions will require you to pass this test. *"If you can't explain it simply, you don't understand it well enough." - Albert Einstein*

You will encounter many formulas in this course. With very few exceptions that I will mention, you should not try to memorize formulas. Memories are fallible, and you can always look up the formulas when you need them. Again, the formulas themselves will generally have an intuitive basis, and that's what you need to focus on.

Homework: Problem Sets and Computer Exercises

Like any mathematically based course, you need to work problems to master the material. Most weeks you will have homework in the form of either problem sets or computer applications. These assignments will be posted on D2L. All homework exercises must be submitted at the end of class on the due date and will be graded. **No late submissions** can be accepted, but you will be permitted to drop one assignment without penalty. In other words, when computing your final homework score, I will drop your lowest score, which could be zero if you fail to submit one assignment. In addition to counting significantly towards to grade, the homework provides vital preparation for the exams. Every student who failed my class last semester (receiving less than a C-) completed less than half of the homework assignments.

You may work your problem sets and computer exercises in teams of two if you choose. However, if you are not an active contributor to the team in doing the homework, it will only hurt you on the exams. All homework must be submitted as hardcopy, including any required computer output. If you work as a team, you need only submit one copy with both names clearly shown and highlighted.

The computer assignments will consist of a data set, instructions for implementing the exercise, and some questions that call for an explanation or interpretation of your estimation and test results. These exercises are designed for the EViews econometric software program, which is available in the Economics computer lab. A more limited student version is also available for free downloading from www.eviews.com, and you will be given instructions on how to download and run this version. EViews is widely used in government agencies and research departments of major corporations. It is easy to learn and to use, but also offers powerful programming capabilities and advanced estimation procedures.

Textbook: Jeffrey M. Wooldridge, *Introductory Econometrics: A Modern Approach*. Sixth edition (2016) Southwestern Publishing. This is an excellent text that could serve as a valuable reference for you in the future. I realize that textbooks are outrageously expensive, and there are options for you to keep the cost down. The fourth and fifth editions of this text will not handicap you in any way. There is also the possibility of renting the text – go to the publisher's website (http://www.cengagebrain.com) for more information.

Grading. Your grade will be based on four equally weighted parts: homework, two midterms, and a mandatory final exam. No make-up exams will be given for any reason. However, an optional portion of the final exam will be offered for anyone wishing to make up for a missed exam or for an unsatisfactory performance on a midterm exam. The optional and mandatory finals will both be given during the 2½ hour regularly scheduled final exam period. The mandatory part will be similar in length to the midterms. It will emphasize the material from the last third of the course, but certainly these topics will build upon earlier material. The optional final will be designed to require 1 1/4 hours to complete, and it will cover material from the two midterm exams. If your score on the optional portion of the final is higher than your lowest midterm score, then this higher score will replace the lower one.

Prerequisites, Classroom Rules, and Other Administrative Matters. The prerequisite for this course is Econ 3818 (Economic Statistics) or a course in mathematical statistics. Introductory statistics courses from departments other that Mathematics or Economics are generally not adequate preparation for 4818. In particular, some background in statistical distributions and the concept of expectations is vital preparation for 4818. Wooldridge presents the essentials of probability and mathematical statistics, as well as some basic math tools, in the Appendices, and we will review these topics within the framework of the regression model at the appropriate time. If you do not meet the prerequisite, but you are confident that you are well prepared for the course based on other similar classes, please discuss this with me before deciding whether to stay in or to drop the class.

You are **not permitted to use cellphones, computers, tablets**, or similar electronic devices during class. There is nothing on your phone or computer, or on the internet, that you will need to access during class, and I am sure that note-taking on an electronic device is not feasible for this class. Please help me avoid embarrassing you in class by following this rule.

According to College rules **incomplete grades** (I) can be given only under the following three conditions: (i) the student must initiate the request for an I; (ii) an I can be given only if the student cannot complete the course for reasons beyond his or her control (such as a medical emergency); and (iii) the student and the instructor must complete and sign an agreement stipulating the reasons for the incomplete and the conditions for completing the course. Additional administrative issues governing disability needs, religious observances, honor code, etc. can be found in the final section of this syllabus covering students' rights and responsibilities in CU courses.

Schedule, readings and assignments. (Chapters refer to our text by Woodridge, ed. 5 or 6)			
Dates	Topic	Readings	Assignments (due dates)
Weeks 1 -3 (1/11 -1/29)	Introduction; causality in econometrics; two variable regression; standard model assumptions; properties of least squares estimators	Chapters 1&2 Appendix A (esp. A1, A5) and B.1 – B.4	problem set 1 (1/19) problem set 2 (1/26)

Week 4 - 6 (2/1 – 2/19)	Multiple regression; omitted variables bias; multicollinearity; **First exam (2/18)**	Chapter 3	Eviews 1 (2/9) problem set 3 (2/11)
Weeks 7 - 8 (2/22 – 3/4)	Hypothesis testing – statistical background Hypothesis testing in regression models	Appendix B5, C5-C6 Chapter 4	problem set 4 (3/1)
Weeks 9 - 10 (3/7 – 3/18)	(Hypothesis testing with EViews) Functional forms and dummy variables	 Chapters 6&7	EViews 2 (3/8) EViews 3 (3/17)
Week 11 (3/21 – 3/25) Spring Break			
Week 12 (3/28 – 4/1)	Review and **second exam (3/31)**		
Weeks 13 - 14 (4/4 – 4/15)	Heteroscedasiticity: definition, implications, testing, treatment	Chapter 8	Problem set 5 (4/12)
Weeks 15 – 16 (4/18– 4/29)	Time series regressions; dynamic models; serial correlation; nonstationary variables.	Chapters 10&12	Problem set 6 (4/21) EViews 4 (4/28)
Final exam Tuesday May 3, 1:30-4:00 p.m.			

CLASS AND UNIVERSITY POLICIES

(1) If you qualify for accommodations because of a disability, please submit a letter to me 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. If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.

(2) 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. Please talk with me if you have scheduling conflicts. If a religious holiday conflicts with the due date of an assignment, I suggest that you turn it in early. If the holiday conflicts with an exam please make arrangements with me at least one week prior to the exam. See full details at http://www.colorado.edu/policies/fac_relig.html

(3) 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. See policies at

http://www.colorado.edu/policies/classbehavior.html and at

http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

(4) 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 discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to 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 discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://hr.colorado.edu/dh/

(5) All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://honorcode.colorado.edu