

**Economics 418:
Introduction to Econometrics
Fall 2005**

1 Course Description

The purpose of this course is to provide you with the tools that economists use for the empirical investigations of economic theories. Econometrics is a blend of mathematical economics (for model-building), probability, and statistics. There are two complementary components to the course: theoretical analysis of linear regression and its extensions (i.e. lots of math) and empirical regression analysis (i.e. lots of computer work). English translation: This will not be an easy course, but it will be valuable.

2 Logistics

Your Professor: I am Manuela Angelucci, your econometrics professor. I am an assistant professor in the Department of Economics in the Eller College. I do (empirical) research in the field of Labor and Development Economics.

My office is McClelland Hall 401AA. You may contact me by email: angelucm@eller.arizona.edu. My office hours will be after class, from 13:45 to 14:45 on Tuesdays and Thursdays.

Your TA: Your TA will be a graduate student in the department of economics and he or she will be the primary grader for the class. The TA's email address and office hours will be made available through Blackboard. The TA's office hours are meant to provide assistance in solving the problem sets. However, do not expect the TA to tell you exactly what to do! You are expected to think independently.

Prerequisites: The formal prerequisite for this course is Economics 339 or equivalent. However, students must have a good working knowledge of (i) probability, (ii) statistics, and (iii) calculus before entering the course. Note: I mean it! The material here is hard enough without having to re-learn all of your math and statistics. We will cover the parts of probability and statistics most important to econometrics in the first several weeks of the class, but that will be no substitute for the solid foundations of a good course.

Meetings: The course meets from 12:30-13:45 p.m. in McClelland Hall 127 on Tuesdays and Thursdays. There will be a Stata session once or twice this semester on a day and time TBA. It will likely be on Tuesday or Thursday, during class time. This is aimed at getting you acquainted with the software Stata, which you will use to solve your problems sets. Actually doing numerical exercises is critical to learning the material and using Stata will definitely help that process.

Distribution of Course Materials: All materials for the course will be distributed through Blackboard. You can log in to blackboard at:

<http://blackboard.eller.arizona.edu>

If you have not used blackboard before, it can sometimes take a few days for your name to be set up. See the website above for more information or help.

Lecture notes for each topic will be uploaded to blackboard the day before the class. You are strongly encouraged to come to class with a printout, and possibly to read them beforehand. In this way you: 1) will not have to take notes of the formulae and proofs, but simply add explanatory notes at the margin; 2) will know in advance which parts you find difficult or unclear, and pay extra attention or ask clarifying questions in class.

3 Textbooks and Computer Programs

Textbooks: Finding a suitable textbook for this course is difficult. The most important source of information for the course by far will be your lecture notes. The books below are meant to assist both the development of “econometric intuition” as well as provide detailed elements of mathematical proofs skipped in lecture. As you might expect, it is hard to find a book that does both well.

The suggested textbook for this course is *Introductory Econometrics* by Jeffrey M. Wooldridge. This is actually quite good at the details and has many examples, but suffers (as do most econometrics texts) from offering too much to students. You may also use *Statistics and Econometrics: Methods and Applications* by Ashenfelter, Levine, and Zimmerman. It is abbreviated in the schedule below. This is very good for the statistics part of the course as well as for intuition for the remainder. It is not good, however, at providing details on all the issues we’ll discuss in class. In both cases, please note the specific sections covered in the tentative schedule below. There is lots

of stuff in each book (especially Wooldridge) that we will not cover. If in doubt during the semester, look to your lecture notes. That is the material that is required. Please feel free to use any other book of your liking.

I want to stress the fact that the lecture notes contain all the information required. The recommended books are not compulsory readings, their only purpose is to provide references and to help clear doubts, should you have any.

Computer Program: There are going to be required empirical problem sets, which you can solve using an econometrics program called Stata. The department of economics has purchased copies of Stata for all of the computers in the Sands Undergraduate Computing Lab and these have now been installed. I also encourage students to purchase their own copy of Stata. If you are interested, you can buy it for the discounted student rate of \$89.00 for a 1-year license or \$129.00 for a permanent license. It is among the most common/popular econometrics computer packages.

4 Assignments and Grading

Problem Sets and Midterms There will be 6 problem sets incorporating both analytical (i.e. pencil and paper) and computer problems (30% of the total grade), one midterm exam (30% each), and a cumulative final exam (40%).

There will be no makeup midterms or problem sets. If you miss a midterm (problem set), but have a *written* excuse, the following tests (problem sets) will be weighted more heavily. The problem set with the lowest grade will not count towards the final grade. This means that each problem set has a weight of 6%. There will not be any makeup finals. One 8.5x11 “formula sheet” (both sides) containing whatever formula you think may help you is permitted for each exam, though it must be all in your own writing and turned in with the exam. **A calculator is also recommended for each exam.**

Working in Groups It is encouraged that you work together in solving the problem sets, but each student must turn in their own written answers, clearly indicating the names of all group members. This is true for both the analytical and computer problems. Groups for solving the problem sets *may not* be more than 3 students. Note: *solving as many problems as possible is the best way to succeed in this course.*

A Warning: Working in groups is a double-edged sword. It definitely helps students as I assign A LOT of homework and it is hard to know all the answers on your own. That being said, it is easy to rely on the "strongest" member of your group in a homework setting and come to regret it during the midterms or final. So **Be Careful**. Make sure *you* understand how to do each problem in your own way. A quick test is to try to teach someone else in your group how to do it after it's been completed. If you can do that, you understand the problem. If you can't, you don't and need to work at understanding it.

Academic Integrity The Eller College has an initiative on Academic Integrity. It is designed to promote ethical behavior on the part of all students, faculty, and staff. I take this very seriously. I have no patience for any of the following:

Academic Dishonesty

Academic Dishonesty occurs whenever any action or attempted action is pursued that creates an unfair academic advantage or disadvantage for you and/or any member or members of the academic community. All forms of academic dishonesty are subject to sanctions under the Code of Academic Integrity. Sanctions include: written warning, reduction in grade for work involved, disciplinary probation, loss of credit for work involved, failing grade in the course, suspension, and/or expulsion. Various forms of academic dishonesty include, but are not limited to cheating, fabrication, facilitating academic dishonesty, and/or plagiarism.

Academic Misconduct

Academic Misconduct is defined as any behaviors not conforming to prevailing standards or rules within the academic community. All forms of academic misconduct are subject to sanctions under the Code of Conduct. Sanctions include: classroom conduct, interim action, program/support, organizational sanctions, restricted access to university property, administrative hold, warning, probation, suspension, and/or expulsion. Various forms of academic misconduct include, but are not limited to disruptive behavior, threatening behavior, and/or the theft or damage of University property.

Any form of academic dishonesty or academic misconduct will be referred to the appropriate authorities and yield a failing grade in this class.

5 Topics

My goal for this course is to teach you two things: (1) Econometric Tools and (2) Econometric “Understanding”. The first is mechanical - how to run a regression, form a hypothesis test, construct a confidence interval, etc. The second is much more conceptual - how to **interpret** your results using your understanding of the economics underlying the process generating your data.

Here is a the list of topics we’ll cover in the course.

1. Maths Review
2. Basic Probability, Multivariate distributions, and Expectations
3. Sampling, Estimation, and Hypothesis Testing
4. The Basic Regression Model
5. Ordinary Least Squares (OLS)
6. Identifying Assumptions and Properties of OLS
7. Multiple Regression
8. Extensions to the Basic Model
9. Dummy Variables, Heteroskedasticity, and Autocorrelation
10. Instrumental Variables
11. Endogeneity and Simultaneous Equations