What Can I Expect from a First Course in Econometrics?

This course is designed for a wide range of students, from those who feel that econometrics is some strange mutation of economics that is difficult to understand, let alone apply, to those who are planning graduate work in economics, and finally to those who love statistical economics (of whom I hope there are many). No matter who you are, though, you should be confident that by the time you leave this course, you will understand that 'the application of statistics to the study of economics,' while perhaps different from what you have seen before, is in fact feasible, if not fun!!! Also, I believe that a basic understanding of econometrics can substantially expand your job opportunities, particularly if you’re planning to graduate and enter the job market in the relatively near future. To illustrate the essentials of what we will be doing throughout the course, consider that most statistics used in econometrics are constructed by just taking averages of numbers! Actually, this is something you all already do, whenever you add up your exam and assignment grades in a course, and come up with your total points, or average points, for example. This is all we’re going to do in this course, but we’re going to learn how to do it well!!
Disclaimer:
Rutgers University encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation in this course or have questions about physical access, please tell the instructor as soon as possible.
Textbooks

1 Required:

2 Optional:


If you want to brush up on some basic probability and statistics, a good text is:

Course Grade

Your grades will be based on a combination of 2 midterms, 3 assignments, and a project.

- **60%**: 30% for each of 2 Midterms
- **15%**: 5% for each of 3 Assignments
- **25%**: Final Project

In particular, for the assignments and the final project, I recommend team work. Note however that each member of a team must hand in her/his *own* assignments. For the assignments, the teams or groups can be any size. Also, working together is advantageous to all, since if everyone gets an A in the class I WILL be very happy, and WILL NOT adjust grades downwards!! The assignments are due at the BEGINNING of the class. In terms of the project, the maximum group size will be 5, and ONLY ONE paper need be handed in per group. The project is due on the last day of lectures. The project should be a typed 7-10 page paper discussing the econometric analysis of a small group of macroeconomic or other series of your choice. The series could be GDP, Unemployment, and Money Supply, for example. I will provide you with multiple datasets, from which you can choose any variables to examine.
Indeed, many datasets are already available on the course webpage which I have constructed for this course, and which is available at the website listed above. You might want to choose from among these datasets when conducting your project research. As an alternative, many students also choose to build their own datasets, after suitable consultation with myself. Overall, the project will entail your discussing the relationship between your chosen economic variables from an economic as well as econometric perspective. We will discuss the project at length, as the semester progresses, and comments and hints will be given in the Economics 322 Webpage.

**Computer Requirement**

This course uses computers. Because of this, all of you are required to be (or become) familiar with the IBMs in the student PC labs. The computer requirement is spread throughout the assignments and the project (although we will not start into any computer work until we’ve completed an extensive review of basic statistics), and you are required to familiarize yourself with at least one computer package (e.g. EVIEWS), without losing focus on the main material in the course. If you have any problems don’t hesitate to approach myself, the TA, or any of the multitude of computer consultants and support staff around campus. Computers CAN be fun, after all, they just do exactly what we tell them to!! We will allot sufficient class time to the discussion of computer assignments. Also, please note that although we may focus on specific software packages, you may use any other software package with which you may be more familiar or more interested in to complete course assignments, projects, etc.

Readings will be assigned prior to the beginning of each section in the course outline. The outline below is meant as a guide to your preparations and studies for this course. However, the outline is meant only as a study guide, as much of the course is self contained (i.e., understanding the lecture notes is sufficient to get a top grade in the course).

**Course Outline**

1. *An Introduction to Econometrics [chpt. 1]*
   - What is econometrics? The Line as an Example.
   - The role of econometrics in economics.
   - Why is all of econometrics just adding up some numbers?
2. *A Review of Some Useful Tools [chpt. 2]*
   - Summations and statistics.
   - Data and random variables.
   - Mean, variance, and other sums of numbers.
   - Back to the line.
   - Hypothesis testing and distributions.
- Expectations and populations versus samples.

3. The Simple Linear Regression Model (Back to the Line) [chpt. 3]
   - Ordinary Least Squares (OLS) as a minimization problem.
   - What can we do with OLS?
   - Assumptions of OLS.
   - Properties of OLS.
   - An example of OLS (that is, an example of a line).
   - Starting the project for this class.

4. Hypothesis Testing and OLS [chpt. 3]
   - Learning about the estimators from OLS.
   - What do we want to know about the estimators from OLS?

5. Multiple Least Squares (LS rather than OLS) [chpt. 4]
   - Back to the line again!
   - Inference and estimation in the LS model of a line.

6. What Does Our Model Really Mean [chpts. 4, 5]
   - Misspecification (missing variables, incorrect model).
   - Errors in the measurement of variables.
   - Model Selection (Schwarz, BIC criteria).
   - Nonlinear functional forms (log versus linear)

7. Violations of the Assumptions in our Model [chpts. 6, 8, 9]
   - Multicollinearity (Causes, effects, remedies, tests).
   - Autocorrelation (Causes, effects, remedies, tests).
   - Heteroskedasticity (Causes, effects, remedies, tests).
   - What does all of this mean for our line?

8. Other Topics as Time Permits [chpt. 5]
   - Lagrange multiplier tests, extensions (nonlinearity tests, addition of variables)
     - "General to Simple" approach to model specification
     - Dummy variables.
     - Large samples versus small, LM tests.
     - Why is economic data different from other data?
     - What remains to be done?

9. We All Know How to Estimate a Line Now!!!!

P.S. At this stage we understand why the statisticians dream is, and always will be:

Oh Lord:
Please make the World Normal, Linear, and Independent!!!
Tentative Dates of Interest

Assignment 1 -

Midterm 1 -

Assignment 2 -

Midterm 2 -

Project - due in last day of classes

Final - to be announced