Economics 3818 August, 2015
Dr. Waldman

Course Information

Econ 3818 is a first course in probability and statistical methods, with an introduction to econometrics.

This is primarily a lecture course in the theory and tools of statistics. Applications will be taken from topics in economics, and other areas. Both simulated and real data will be used in these examples.

Instructor

Donald M. Waldman, Professor

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TR 12:30 - 2:00 pm

Teaching Assistant

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Instructor Short Biographies

Donald Waldman is a professor in the Economics Department. Both his teaching and research concentrate on statistical methods (econometrics) and applied microeconomics (environmental economics, nonmarket valuation, labor economics, industrial organization). He has taught this course many times.

Zach Szlendak is an advanced Ph. D. student in the Economics Department. He has taken many of the statistics/econometrics course offerings of the Department.

Prerequisites

The most important background to bring into this course is ability to think abstractly. In addition, students will find it easier if they have a good understanding of algebra at the level of high school Algebra II; differential and integral calculus play a smaller role in this course, but they will be used. This material will be reviewed during the course.

The course prerequisites are *one* of the following:

MATH 1310;
MATH 1081;
MATH 1080, 1090, and 1100;
APPM 1350.

If you have not taken one of these classes, you cannot take Econ 3818, unless you come to see me about it.

In the first week of class:

- Please read Caniglia (the course textbook), Chapter 2.
- If you are not already comfortable with it, try out Microsoft Excel. The University has a site license to the MS Office package, so you can get it for free. It is often included in Windows PCs and some Macs, and it is available on all computers in the CU computer labs. If you are using your own computer, install the Analysis ToolPak add-in program. Here are instructions to do so for a Windows machine:

  Click the File tab, and then click Options.
  Click Add-Ins, and then in the Manage box, select Excel Add-ins. Click Go.
  In the Add-Ins available box, select the Analysis ToolPak check box, click OK.
  If Analysis ToolPak is not listed in the Add-Ins available box, click Browse to locate it.
  If the Analysis ToolPak is not currently installed, click Yes to install it.
  The Data Analysis command will now be available in the Analysis group on the Data tab.

The following is a list of sections, one covered roughly every three weeks. This list may be useful to you to see where we are in the text or if you have had a statistics course previously (but I expect it will have little meaning to most of you at this point).

Section 1

- Research in "Hard" and "Soft sciences
- Introduction to probability. Axioms; Venn diagrams
- Addition and complement rules of probability
- Conditional probability
- Tree diagrams
- Independence and mutual exclusivity
- Bayes' law
- Urn problems
- Bayes' Law for partitions

Section 2

- Random variables and probability distributions
- Discrete random variables; the probability mass function
- Bernoulli, binomial, and Poisson random variables
- Mathematical expectation
- Expectation of a function of random variables; variance
- Continuous random variables; the probability density function
- The power, exponential, and standard normal distribution
- Bivariate, marginal, and conditional distributions
- Conditional expectation and variance
- Covariance and correlation

Section 3

- The general normal distribution
- From probability to statistics - population and sample
- Sampling theory - the distribution of the sample mean
- The Central Limit Theorem
- The chi-squared distribution
- Point estimation
- Unbiasedness as a property of an estimator
- Relative efficiency and best (minimum variance estimation)
- Examples from portfolio theory
- Comparing biased and unbiased estimators--mean-squared error
- Maximum likelihood estimation
- Confidence intervals

Section 4 - hypothesis testing

- Introduction - the State of Nature and the outcome of a test
- Type I and Type II errors. The power of the test
- Testing hypotheses about the population mean - classical method
- p-value and the p-value method of testing hypotheses
- Using confidence intervals
- Testing hypotheses about the population proportion
- Some caveats in testing hypotheses

Section 5 - the classical, normal, linear regression model

- Model specification and assumptions
- Estimation and hypothesis testing
- Prediction and goodness-of-fit
- Multiple regression
- Review

Text

Caniglia, Statistics for Economists, An Intuitive Approach, Harper Collins Publisher, 1992. This book is out of print, but available in soft cover at the CU bookstore for $60. Since there is no disk or key to unlock a publisher web site associated with this book, and since there is only one edition, any used copy is equivalent to a new copy. The text has been used for this course at CU for the last four semesters, so that it is available on all the second hand book sites, on line (3rd party through Amazon, currently starting at $16), and other places.

Grading Criteria

- *Quizzes* (15%)
- *Weekly Problem sets* (20%)
- *Three midterm exams* (15% each)
- *Final exam* (20%)

Course grades will be assigned based upon overall percentage course score:

93 - 100	A
90 - 92	A-
87 - 89	B +
84 - 86	B
80 - 83	B -
75 - 79	C +
70 - 74	C
65 - 69	C -
60 - 64	D

answers to quizzes and problem sets will be made available shortly after their due date and time. This means strict deadlines for completion of quizzes and problem sets.

The lowest problem set score and the lowest quiz score will be dropped. Given this policy, the fact that solutions will be posted immediately after the assignment is due, and the importance of keeping up on the material in this course, **no late problem sets or quizzes will be accepted**.

Students with Disabilities and the Honor Code

Notice for students with disabilities:

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-