

Economics 3818
Dr. Waldman
Room 108

August, 2014
waldman@colorado.edu

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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E-mail: waldman@colorado.edu
T 4:45 - 6:00 pm, W 8:30 - 10:00 am
and by appointment

Teaching Assistant

Paulo Saraiva, Ph. D. Student
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Office hours to be announced

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 the classroom version of this course many times.

Paulo Saraiva is an advanced Ph. D. student in the Economics Department. He has taken all of the statistics/econometrics course offerings of the Department. He has taught this course and has been a TA for this course in past semesters.

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 of the lectures.

The course prerequisites are *one* of the following:

ECON 1078 and 1088;

MATH 1300;

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.

For a Mac, see <http://support.microsoft.com/kb/914208>

Course Objectives

- Statistics is the study of data (resulting from either the physical or social world) that is subject to randomness. The major objective of this course is to convey the basic language, mathematical symbols, tools, and techniques of statistics.
- Statistics is the building block of econometrics, which is the application of statistics to economic models and data. A second goal of this course is to provide an introduction to econometrics.
- Since the applied economist uses statistics on data, a third objective of the course is provide the student with the ability to organize and investigate data using Microsoft Excel.

Content Presentation

There will be two lectures weekly, meeting Tuesday and Thursday from 12:30 to 1:45 p.m. in Benson Earth Sciences rm. 185. You should be registered in one of the recitations:

011	4:00-4:50 M	MCOL E186
012	5:00-5:50 M	CLRE 212
013	8:00-8:50 W	HLMS 196

- 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

available. The quiz for material covered Thursday will be available after the lecture and must be completed by 12:30 pm on the following Tuesday, and again after that time, solutions will be made available.

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).