3818 - Introduction to Statistics (Online)
Syllabus/Course Information

Course Description

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

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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 the classroom version of this course many times.

Patrick Gourley is an advanced Ph. D. student in the Economics Department. He has taken most of the statistics/econometrics course offerings of the Department, some with Professor Waldman. He has been a TA for this course taught in a classroom.

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.

Prior to the start of class:

- Please read Caniglia (the course textbook), Chapter 2.
- Log in to Zoom.us. View the demo. Sign up for a free account. Try hosting a meeting with someone in the class, or with any friend.
- Try out Microsoft Excel, often included in any Windows PC and some Macs, 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:

  Click the File tab, and then click Options.
  Click Add-Ins, and then in the Manage box, select Excel Add-ins. Click Go.

- 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

Week 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

Week 5 - the classical, normal, linear regression model

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

Text

Caniglia, Statistics for Economists, An Intuitive Approach, Harper Collins Publisher, 1991. 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. At this date there are 18 used, hard copies available on Amazon, also for $60. 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, at the Colorado Bookstore on College Avenue in Boulder, and other places.

Student Responsibilities/Grading

This is a one-semester course in statistics. In a typical 15 week semester, there are three 50 minute lectures, which means there are 15 ¢ 3 ¢ 50 ¼ #,#&! minutes of lecture time. This summer session course is five weeks long, with nominally four days of "contact" time per week. Therefore, if you wish to view the lectures only on Monday - Thursday of

each of the five weeks, this would require you to view ##&!îð& ¢ %ñ ¼ ""#þ& minutes of lecture each day. In my experience, for a student with average mathematical background, an additional hour to an hour and a half *per day* will be required to read the text and work out assignments to fully understand the course material.

Assessment

Like many courses but unlike, perhaps, a "topics-in something" course, this course is sequential in nature. That is, Week 2 material will likely be unintelligible unless Week 1 material has been mastered. In fact, Wednesday's segments may not make sense unless Monday's and Tuesday's segments have been viewed and understood.

Therefore, to make understanding material easier, answers to quizzes and problem sets will be made available shortly after their due date and time. This means strict deadlines on when quizzes, and problem sets (and midterms) can be completed. All of this is another way of saying

This is not a "self-paced" course!

To get credit for assignments, they must be done in the allotted window.

There will be:

- Two 10 minute quizzes each week. The quiz for material covered Monday and Tuesday must be completed by 11 pm on Tuesday, after which solutions will be available. The quiz for material covered Wednesday and Thursday must be completed by 11 pm on Friday, and again after that time solutions will be available.

- Twice-weekly problem sets. The problem set for material covered Monday and Tuesday must be completed by 11 pm on Friday, after which solutions will be available. The problem set for material covered Wednesday and Thursday must be completed by 11 pm on Sunday, and again after that time solutions will be available.

- Three online midterm exams, one each at the conclusion of weeks two, three, and four.

- A comprehensive online final exam given after the last day of class.

Submitting Written Work:

All written work: quizzes, final and midterm exams, and problem sets, will be completed either using a word processor or hand-written, then scanning to a .pdf file and uploading to the course Dropbox before the due date and time. Since much of your written

assignments will require mathematical notation, for example

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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: 303-492-8671, Willard 322, and www.Colorado.EDU/disabilityservices

Disability Services' letters for students with disabilities indicate legally mandated reasonable accommodations. The syllabus statements and answers to Frequently Asked Questions can be found at www.colorado.edu/disability services

Honor Code Policies

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://www.colorado.edu/academics/honorcode/