DEPARTMENT OF ECONOMICS
College of Management and Economics
ECON 3740 Introduction to Econometrics, Fall 2011

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Office Hours & Teaching Schedule
Course home page: http://trex.econ.uoguelph.ca/dprescot/374f11/374.htm

Please note that it is your responsibility as a student to be aware of and to abide by the University's policies regarding academic misconduct, e-mail communication, maintaining copies of out-of class assignments, what to do when you cannot meet a course requirement and the drop date for this semester. To better understand these policies,visit: Student Responsibilities

COURSE OUTLINE

Econometrics is the application of statistics to the analysis of economic data and economic models. This course will introduce students to the theory and practice of econometrics. Sufficient statistical theory will be covered to provide a foundation for the estimation of a single equation economic model and for hypothesis testing in this context. Emphasis will be placed on practical application and particularly on the quality of written reports. Writing skills are important and valuable in all work environments. In this course, students assume the role of analysts charged with undertaking studies for a client. The client will demand accurate and dependable statistical analysis and written reports that are clear, complete and yet concise. The client will need to understand the methodology at an intuitive level and fully grasp the implications of your statistical analysis.

Learning Objectives

An understanding of statistical concepts and their application is reflected in a variety of ways. The most fundamental form of communication is through language, written and spoken. Consequently, a basic objective of this course is to develop an understanding of statistics that can be expressed in words, particularly in written form. Precision and clarity of statistical ideas is also captured in their mathematical representation and a good understanding of statistics is demonstrated by an ability to recall and explain mathematical formulations and in some cases to derive certain mathematical results. This ability is not a matter of memory alone, but rather a result of a deep intuitive understanding. It is also important to understand what information is emodied within a statistical measure - for example, what does a particular measure tell us about a collection of data? Statistical concepts are often represented in a mathematical form that, like other languages, has widely accepted conventions and syntax - an understanding of statistics requires an ability to correctly use the syntax of conventional statistical notation. In this course, almost all statistical concepts that we discuss will be calculated numerically and/or represented in charts. In short, the statistical concepts that will be discussed will also be used. The computing skills required to undertake thses calculations and to create the charts will be developed and supported in the course.

Topic	Objectives

Univariate Distributions (single random variables)	Understand: the key summary statistics that describe univariate distibutions (mean, standard deviation, variance and skewness) as well as: the expections operator, E; the distinction between populations and samples, between population parameters and sample statistics; the concept of a sampling distribution.
Bivariate Distributions (single random variables)	Understand the key summary statistics that describe bivariate distibutions (covariance and correlation) as well as: the concept of the population regression function and its properties; how the population regression function can be estimated using a simple nonparametric method; the concept of nonparametric estimation.
Optimal Predictors	Prediction is an important area of application - poor predictions can lead to economic losses or larger losses than if better predictions had been available. We will discuss a general framework within which the optimal predictor of a random variable can be defined and determined. In particular, we will discuss under what circumstances the mean (or the conditional mean) of a random variable is the optimal predictor. We will also connect the ideas of optimal prediction, the regression function and the principle of least squares.
Statistical Estimation	Understand the problem of statistical estimation as well as: the criteria used to evaluate statistical estimators (unbiasedness, minimum variance, consistency); some principles of statistical estimation - least squares, maximum likelihood and the method of moments; how these methods of estimation can be used to estimate a linear regression model.
The Properties of Least Squares	Understand the properties of the least squares (LS) estimator of the linear regression function including: the interpretation of regression coefficients; the factors that incluence the sampling distribution of the LS estimator; the concept of R-squared (goodness of fit); the effect of rescaling data on regression coefficients;
Hypothesis Testing	Understand how hypotheses can be tested in the context of linear regression analysis and in particular learn how and when to conduct: t-tests; F-tests.
Functional Form	Understand the distinction between the linear and semi-logarithmic models and estimate a semi-logarithmic model and interpret the coefficients
Computing tools	The course places considerable emphasis on the analysis of data and report writing. To this end, support will be given in these areas: the university LINUX system which is used to access and analyse data; use of a telnet connection to run TSP programs from any location with internet access; use an FTP connection to move files to/from a local pc from/to the remote LINUX system; use a spreadhseet to chart data; use the statistical program TSP to analyze a large sample of data (TSP runs on

the university LINUX system.)

Student Evaluation of the Course

You will be asked to complete an evaluation of this course at some time during the last two weeks of the semester. The Department of Economics policy regarding the conduct and use of course evaluations can be found at: Student evaluation of economics courses

The Nature of Independent Work

The research reports are individually authored and must therefore be the work of individual students. However, it is natural and reasonable that students help and talk to each other. Indeed this is encouraged. Through this type of interaction students will better understand how to interpret the course requirements and improve their knowledge of econometrics and the associated computing skills. However, some specific activities are not allowed in this course and constitute academic misconduct. Prohibited activities include:

- The use of text, charts or any other material from reports written by students who have taken this course
- The joint production of written work, showing drafts or finished work to *anyone* else before the submission deadline.
- The sharing of files (unless distributed by the instructor) and the preparation of written material for other students.

In short: write your own material and keep your work to yourself. You alone are responsible for editing your written work.

Evaluation The final grade will be determined as follows:

Component	**Completion date**	**Total weight**
Two research reports @ 20% each	Report 1: Due* by noon on Thu 20 Oct	20%
	Report 2: Due* by Noon on Thu 1 Dec	20%
Term test	In class, date Thur. 27 Oct	20%
Final Examination	Consult official sources	40%

* Note that reports are not accepted after the due date. Where necessary, incomplete work should be submitted by the due date and time.

Provided that the final exam grade exceeds 50%, the final exam grade, X, will replace the term test grade, Z, if X > Z. Hence, the weight attached to the term test can be automatically shifted to the final exam if it is to your advantage. For example, if you miss the term test for any reason, the term test weight will be shifted automatically to the final exam. Reports will not be accepted after the due dates and the weight attached to individual reports will not be changed. There will be no make-up term test. The final exam will be administered by the registrar's office; there will be no alternative final examination.

Course Format

There are two lecture classes per week and one computer lab. The lecture classes will be primarily devoted to

discussing the statistical theory that is needed to complete the research reports. But we will also discuss practical issues related to the written reports. The computer labs will provide instruction on the computing environment and an opportunity to work on the reports. Finding an available computer on campus during busy times can be frustrating. The lab will give you at least one hour per week when you can be assured of a seat. Please attend all lab sessions. I cannot justify booking a lab for your exclusive use if the seats are not occupied. The course is designed in such a way that you can complete the vast majority of the work on a home-based computer. You will not need any specialist software other than a word processor and a spreadsheet program. If you have internet access, then you will be able to do all the statistical analysis remotely by opening a telnet session with the University of Guelph's LINUX system.

Course Materials

No specific textbook has been assigned for this course. Class notes will be available on the course web site (see the course materials section.) The notes are in pdf format.
News items, grades, useful links and supplementary notes also will be available on the course web site.

Communicating with the Instructor

You can see the instructor during office hours or at other arranged times. In many cases the best way to communicate is by e-mail, which is often the fastest way to get answers to computing and other problems.