

**Department of Economics**  
**Carleton University**  
**ECON 6005F**  
**ECONOMETRICS II**  
**Fall 2010**

**Instructor:** Marcel Voia, D893 Loeb Building, email: mvoia@connect.carleton.ca

**Time and Location:** T 2:35 - 5:25pm TBA

**Office Hours:** TBA 1:00 - 3:00.

### **Course Requirements**

This course is the advanced introductory econometrics course in the economics department at Carleton University. Prerequisites are ECON 5005. Computer programming experience is helpful but not required. *The course is a required course for the PhD program.*

### **Accommodation**

Students requiring academic accommodation due to a disability should feel free to come and discuss their concerns with the instructor. In addition, such students are strongly encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary letters of accommodation as soon as possible.

Students requiring academic accommodation due to a religious obligation should also feel free to come and discuss their concerns with the instructor.

Finally, students who are pregnant or who become pregnant should feel free to come and discuss their concerns with the instructor. They are also strongly encouraged to contact Equity Services to obtain the necessary letters of accommodation as soon as possible.

### **Optional Textbooks:**

Although lecture notes are provided during the term, it is important that you reinforce this material by referring to more detailed texts. There are some excellent advanced textbooks covering different aspects of the course in detail, and more general textbooks covering broader areas at a less specialized level:

Baltagi, B.H. (2008), *“Econometric Analysis of Panel Data, 4th Edition”* New York: Wiley.

A. Colin Cameron and Pravin K. Trivedi (2005), *“MICROECONOMETRICS: Methods and Applications”* Cambridge University Press, New York

The above book can be combined with:

A. Colin Cameron and Pravin K. Trivedi (2009), *“Microeconometrics Using Stata*, Published by: Stata Press

W. H. Greene (2003) *“Econometric Analysis”*, 5th ed. Prentice Hall.

Wooldridge, Jeffrey M. (2002), *“Econometric Analysis of Cross Section and Panel Data”*, The MIT Press

Lancaster, T. (1986), *“The Econometric Analysis of Transition Data”*, Econometric Society Monographs, Cambridge

Maddala, G.S (1983), *“Limited-Dependent and Qualitative Variables in Econometrics”*, Econometric Society Monographs, Cambridge

**Grading:** There will be assignments, a midterm exam and a final exam. The final grade scheme is given below:

Assignments	30%
Midterm Exam	30%
Final Exam	40%.

While student cooperation and discussion is encouraged, theoretical homework assignments must be the work of the student whose name appears on them (i.e., your own). In this connection, the following plagiarism advisory issued by the Department of Economics should be carefully heeded:

“Please be aware that plagiarism is a serious academic offence and one which should be recognized and avoided. For further information regarding this subject, please see the Economics website [www.carleton.ca/economics](http://www.carleton.ca/economics)

or pick up a handout from the Department.” On the homework assignments with empirical contents, groups of three might be allowed (hand in one copy per group with all the names on it). Each homework is due at the beginning of class at the due date. Please turn homework in on time as late homework will not be accepted and assigned the grade of zero.

**Exams:** The midterm exam will be on the 6th week of classes. The final exam will be announced in class. Except in the case of a family emergency or medical absence confirmed by a dean, no makeup or early exams will be given. Any other requests for special circumstances regarding homework or exams must be presented in writing within the first two weeks of the semester.

## Description of the Course

### 1. Background and Objectives:

Given the extensive availability and use of individual-level data sources in applied economic analysis, it has become increasingly important to understand the techniques available to the microeconometrician and the macroeconometrician in applied research, how these techniques relate to economic theory, and what insights can be drawn from the estimation of microeconomic or macroeconomic models. The purpose of these lectures is to provide you with sufficient background in modern microeconomics and macroeconomics to choose techniques suited both to the data-source and the economic model.

The microeconomic focus means that data used for the model are usually cross-section or longitudinal rather than time series, and that decisions are typically modeled at the level of the individual or firm. The macroeconomic focus means that the data used for the model is cross-section or time series and the decisions are modeled at the aggregate level. The assignments will have both a theoretical component and an applied work component. Instruction in computer software will be given as the course proceeds.

### 2. Course Content

*Lecture 1.* Basic Probability Concepts and Asymptotic Results

*Lecture 2.* Binary Choice Models and Multiple Discrete Choice Models

The Linear Probability Model; binomial probit; binomial logit; assumptions; Maximum Likelihood estimation methods; interpretation of coefficients; constructing probabilities; restrictions and limitations; marginal effects; measuring goodness-of fit; testing parameter restrictions. Ordered probit/logit; sequential probit/logit; methods of estimation; multinomial logit (MNL); the Independence of Irrelevant Alternatives (IIA) assumption; bivariate and Multinomial Probit models; measuring goodness-of fit; testing assumptions.

*Lecture 3.* Limited Dependent Variable Models

Truncated and censored samples; sample selection bias; the truncated regression model; marginal effects; the Tobit model; interpretation of Tobit model coefficients; testing for normality; limitations of the Tobit model, the Double Hurdle (DH) model; the DH model with dependence; switching regressions; diagnostic testing.

*Lecture 4.* Duration Models and Survival Functions

The Kaplan Meier estimator, proportional hazard models, parametric and semiparametric hazard models, duration dependence; heterogeneity; time varying regressors, models for survival data; methods of estimation; testing.

*Lecture 5.* Panel Data Models General Definitions

Fixed effects and random effects panel data models; methods of estimation; random coefficients; discrete choice panel data models; diagnostic testing; dynamic and nonlinear panel data models.

*Lecture 6.* Quantile regression

Quantiles via optimization, confidence intervals, covariance and correlation of parameter estimates, testing, leverage point and outlier detection.

*Lecture 7.* Nonparametric and Semiparametric Estimation Methods

General definitions; kernel density estimation; Nadaraya-Watson nonparametric regression function; bandwidth selection; average derivative estimation; bootstrap methods and confidence bands; semiparametric estimation methods; partially linear models.

*Lecture 8.* Generalized Method of Moments (GMM)

GMM estimator, asymptotic properties, optimal weighting matrix, efficient GMM estimator, testing for overidentifying restrictions, hypothesis testing.

*Lecture 9.* Program Evaluation Models

Causality and Counterfactual Causality, Social experiments: Randomized and Non Randomized Experiments, Selection on Observables, Selection Models, Differences-in-Differences, Treatment Effects.

*Lecture 10.* Distribution Analysis

Unimodal and Mixture distributions, Dominance Testing, Measures of Inequality.

*Lecture 11.* Time Series Models.

ARCH, GARCH, Stochastic Volatility Models.

### **3. Computer-Based Practical Exercises**

During the course of the term you will be set specific practical exercises which implement the methods discussed in the lecture programme. These exercises will be designed both to establish a practical understanding of the material covered in lectures, and to provide some experience in the use of the regression software.

The most common packages available on the market are R (free to download and use for academic purposes) Ox (free to download), GAUSS, STATA and Limdep. We will concentrate on the use of R, Ox, GAUSS and STATA as preferred statistical packages.

**If you have any problems with this course please contact me!**