UNIVERSITY OF
WATERLOO

**Department of Economics**
**Economics 321: Introduction to Econometrics**

**Course Outline**
(Winter 2011)

**Instructor:** Chaussé, Pierre
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**Lecture Time:** T-Th 1:00 to 2:20 **Lecture Location:** AL 211

**Office Hours:** Friday, 9:30 to 12:00

# Course description

This is an introductory course in the theory and practice of econometrics, focusing on multiple regression analysis and associated topics such as multicollinearity, heteroskedasticity, serial correlation and endogenous regressors.

The lectures will be a mixtures of mathematical proofs and numerical applications. Being able to demonstrate de properties of estimation procedures is essential because it allows a better understanding of the source of problems that can affect the quality of estimators and makes it easier to find solutions. Through several applications, students will also learn how to interpret the results correctly and how to detect several types of misspecification that can lead to wrong conclusions.

Another objective of the course is to teach students how to estimate models using an econometric software. If you already know a particular software and want to use it, I don't have any objection. However, I will not accept any assignment produced by a spreadsheet like Excel. They are made to add and subtract numbers and should only be used for that purpose. Those who decide to do so will get 0.

There are many different good econometric software. The most popular in the department is Stata, which is the one used in the other section of the course taught by Professor Lluis. You can use it if you want but I won't provide any support. I will be using the open source package GRETL (Gnu REgression and Time series Library). It is a very simple program that competes with the most sophisticated ones. I will show you how to use it throughout the semester. It can be downloaded at: http://gretl.sourceforge.net/ and is available in most computer labs.

# Textbook

The students are expected to read the chapters mentioned in the Topics section below. Ideally, the readings should be done before attending the lectures.

• Wooldridge, Jeffrey M., *Introductory Econometrics: A Modern Approach* Fourth Edition, South Western-Cengage Learning 2009 **(previous editions can also be used)**

# Topics

For each topic, some problems are suggested. It is strongly recommended to try them before looking at the solution. They are good examples of the kind of questions you will find in the exams.

1. Introduction: (Appendices B and C)
   *Overview of important concepts in statistics*

2. The simple regression model (Chap. 1 and 2)
   *Discussion on the different types of data, estimation of models with 1 regressor, and the interpretation of a regression.*

   ◇ **Theoretical problems:** 2.1, 2.2, 2.5, 2.6, 2.8

   ◇ **Numerical problems:** C2.4, C2.6, C2.7

3. Multiple regression models (Chap. 3)
   *Issues regarding data and model selection.*

   ◇ **Theoretical problems:** 3.1, 3.4, 3.6, 3.7, 3.12, 3.11

   ◇ **Numerical problems:** C3.1, C3.2, C3.6, C3.7

4. Inference (Chap. 4) )
   *Tests of single and multiple linear restrictions*

   ◇ **Theoretical problems:** 4.1, 4.2, 4.6, 4.8, 4.10, 4.11

   ◇ **Numerical problems:** C4.2, C4.3, C4.6, C4.8

5. Asymptotic properties of the OLS estimators ( Chap. 5)
   *Analysis of the properties of the estimators when the sample size increases*

   ◇ **Theoretical problems:** 5.1, 5.2

   ◇ **Numerical problems:** C5.1

6. Functional forms and forecasting (Chap. 6)
   *Discussion on how to choose the functional form, and the forecasting of the dependent variable.*
   - ◇ **Theoretical problems:** 6.1, 6.3, 6.2, 6.7, 6.8
   - ◇ **Numerical problems:** C6.1, C6.3, C6.5, C6.9
7. Regression with dummy variables (Chap. 7)
   *Including unquantifiable information in a regression: the qualitative variables*
   - ◇ **Theoretical problems:** 7.1, 7.2, 7.5, 7.8, 7.9
   - ◇ **Numerical problems:** C7.2, C7.4, C7.8, C7.14
8. Generalized linear models: Heteroscedasticity ( Chap: 8)
   *The properties of OLS with heterogenous error terms, and the GLS method*
   - ◇ **Theoretical problems:** 8.1, 8.2, 8.5, 8.7
   - ◇ **Numerical problems:** C8.1, C8.5, C8.8, C8.12
9. Generalized linear models: Autocorrelation ( Chap: 10, 11(not to read) and 12 (except section 12.6)
   *The properties of OLS with time series data and weakly dependent error terms*
   - ◇ **Theoretical problems:** 10.1, 10.2, 10.5, 12.1, 12.2, 12.3
   - ◇ **Numerical problems:** C10.2, C10.8, C12.8, C12.10, C12.12
10. The instrumental variables method (Chap: 9 (section 4) and 15 (sections 1 to 5))
    *Measurement errors, endogenous regressors and the 2SLS method (If we have time).*

# Evaluation

Homework (between two and four): 20%
Midterm exam (January 25th): 20%
Midterm exam (March 1st): 20%
Final exam (cumulative): 40%

**Policy regarding assignments:** The assignments are due at the beginning of class on the due date. If I leave the class without your copy, you get 0. I won't accept excuses like: ma printer did not work, my teammate let me down etc. Don't wait until the last minute to do it and you won't get those problems.

**Policy regarding missed exams:** There is no make-up exam for the mid-terms. Students will be graded on the alternative scheme: 60 % on the final if one of the mid-terms is missed and 80% if both are missed. Only serious problems can justify an absence. If you miss an exam because of health problem, you have to provide the appropriate original documentation from your doctor. If you miss the scheduled final exam, you MUST petition the department within five calendar days to write the departmental deferred examination. If the student has failed to write the departmental deferred examination, the student will automatically receive a grade of 0 for the missed deferred final examination.

**Class canceled:** There is no class on March 15 because of the University March Break Open House.

# Avoidance of Academic Offenses

All students registered in the courses of the Faculty of Arts are expected to know what constitutes an academic offense, to avoid committing academic offenses, and to take responsibility for their academic actions. When the commission of an offense is established, disciplinary penalties will be imposed in accord with Policy #71, Student Academic Discipline. For information on categories of offenses and types of penalties, students are directed to consult the summary of Policy #71, Student Academic Discipline http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm

If you need help in learning how to avoid offenses such as plagiarism, cheating, and double submission, or if you need clarification of aspects of the discipline policy, ask your course instructor for guidance. Other resources regarding the discipline policy are the graduate advisor and the Associate Dean of Graduate Affairs. Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm