University of Waterloo
Department of Economics
Economics 421

Course Outline

(Fall 2011)

Instructor: Dinghai Xu

Office: HH 201   **Phone**: 519-888-4567 ext. 32047
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Lecture Time: M. & W. 14:30 to 15:50   **Lecture Location**: ML 354
Office Hours: Fri. 1:30 to 3:00 or by appointment
TA: TBA

Course Description

This course covers several theoretical/applied topics in Econometrics, including regression models, some popular estimation methods and time series analysis. This course will provide a good understanding of the techniques and inference widely used in applied research in economics. The details for each topic of this class are listed below.

The lecture material will be based on a collection of reference books and/or published papers. There is no required textbook.

Useful References:

[1] **Econometric Theory and Methods**, by R. Davidson and J. G. Mackinnon, Oxford University Press, 2004
[2] **Econometrics Analysis**, by W. H. Greene, Fifth Edition, NY, Macmillan, 2003.
[4] **Time Series Analysis**, by J. D. Hamilton, Princeton University Press, 1994.
[4] **Econometrics,** by F. Hayashi, Princeton University Press, 2000.
[5] **Probability and Random Process**, by G. R. Grimmett and D. R. Stirzaker, Oxford Science 1992.

Journals:

Econometrica, Journal of Econometrics, Journal of Business and Economic Statistics, Journal of Finance, Journal of Financial Econometrics, Journal of Applied Econometrics and etc.

Topics

1. Overview of Important Concepts in Statistics
Random Variable and Probability
Distribution Functions
Moments and Statistical Inference

2. Topics in Regression Models and the Statistical Inference
Linear Regression Models
Non-Linear Regression Models
Multivariate Regression Models
Model Mis-specification Analysis

3. Topics in Estimation Methods and Procedures
Method of Maximum Likelihood Estimation (MLE);
Method of Moments (MOM)/ GMM;
Generalized Least Squares (GLS) Procedure
Instrumental Variable (IV) Estimation (2SLS)
Monte Carlo Simulation

4. Topics in Time Series
Introduction of Stochastic Process
Statistical Properties of Stationary ARMA
Autoregressive Conditional Heteroskedasticity (ARCH) /
Generalized ARCH (GARCH) Models
Stochastic Volatility Models
Non-Stationarity in Time Series

Some related papers (empirical / theoretical) for each topic might be discussed in the class.

Computing SoftWare

There might be several problem sets which require using statistical software for computation. Feel free to use any computing package you prefer. But I would suggest Stata or Matlab. Some popular computing software packages have been installed in the computers in the computer Lab or in Arts' public computing labs. For more information, please consult the Information Systems and Technology (IST) office.

Course Requirements

- Assignments (20%)
- Midterm Exam (30%)
- Final Exam (50%)

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