Econometrics II (ECO 7425-U02)
Class No. 81484
Department of Economics, Florida International University
Fall Semester 2015

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Office Hours:  Tue & Thurs 08:15-09:15 am and by appointment
Lectures: Tue & Thurs 09:30-10:45 am in Chem & Phy 103

Textbook
None.

For Reference:
William E. Griffiths, R. Carter Hill, and George G. Judge (1993),
Learning and Practicing Econometrics, John Wiley & Sons, Inc.
An Introduction to the Theory and Practice of Econometrics,
John Wiley & Sons, Inc.
Sons, Inc.
Russell Davidson and James G. MacKinnon (2004), Econometric Theory and
Methods, Oxford University Press.
Andrew C. Harvey (1991), An Econometric Analysis of Time Series, 2nd Edition,
Cambridge University Press.

Reference for Applications in Economics and Finance:
Ernst R. Berndt (1996), The Practice of Econometrics: Classic and Contemporary,
Addison-Wesley Publishing Company.
Course Objectives
The course has two objectives. The first is to introduce some advanced topics in econometrics beyond those covered in Graduate Econometrics I. This will consist of various traditional topics in econometrics such as seemingly unrelated regression (SUR) equations, simultaneous equations models, non-linear models and the associated numerical optimization techniques, maximum likelihood estimation method, model selection and test procedures. Regular homework assignments will be given to enhance understanding of the core material in the course.

The second objective is to get students familiar with the art of conducting empirical work in econometrics through the use of suitable computational software. Towards this end, computer assignments will be given periodically throughout the course. Students are required to work with the GAUSS software for their homework assignments.

Assessment
The course assessment will consist of several homework and computer assignments together worth 60%, and a final exam (or, paper + presentation) worth 40%. A necessary but not sufficient condition to qualify for a passing grade in the course is to turn in all homeworks assigned in the course on time.

Guidelines for Submitting Homework and Computer Assignments
Homework and computer assignments will be given throughout the semester on all major topics covered in the course. A total of five assignments will be given in the course. Each will consist of several questions, analytical and computational, frequently from the back of the chapters in the textbook. Students are responsible for answering all the questions assigned for each homework.

Students are encouraged to work in collaboration with a partner on their homework and computer assignments. Only one copy of the homework / computer assignment is to be handed in between every two students.

Although I do not expect typed homework submissions, these nevertheless have to be neatly written, stapled, concise yet complete, and include all relevant computer programs and computer output where appropriate.

Students need to submit the computer code written for their homework electronically by e-mail as well.

Solutions to the homework questions will be discussed in class.
Late assignments will not be accepted for any reason whatsoever.

Makeup Examination
There will be no makeup examination under any circumstances.
Grades

The final course grade will be based on the cumulative total score in the course comprising of the scores on the homework and computer assignments, and the final exam. Letter grades will be based on the distribution (“curve”) of these final scores of all students in the course. Depending on the overall performance of the students, the minimum total score required to obtain a particular grade (“the cutoff”) will be determined at the end of the semester.

Course Outline (tentative – subject to revision)

Chapter numbers below refer to those in Greene’s book listed under References on the first page.

   a. Alternative Functional Forms for Econometric / Statistical Relationships
   b. Calculus of Derivatives
   c. Non-Linearity in Variables and Non-Linearity in Parameters
   d. Examples of Non-Linear Models
   e. Estimation – Non-Linear Least Squares
   f. Numerical Optimization – see next topic
   g. Properties of the Non-Linear Least Squares Estimator

2. Numerical Optimization. Appendix E.
   a. Principles of Numerical Optimization
   b. Univariate Search Techniques – grid search method
   c. Direct Search Methods – simplex method
   d. Descent Methods – method of steepest descent
   e. Newton-Raphson Method – safeguards and modifications, quasi-Newton methods, Gauss-Newton method
   f. Convergence - problems
   g. Numerical Evaluation of Derivatives
   h. Selection of Starting Values
   i. Constrained Optimization – imposing constraints through algebraic transformations
   j. Standard Errors by the Delta Method

Homework Assignment 1:
   Questions:
   Due Date:

   a. The Principle of Maximum Likelihood
   b. The Likelihood Equations
   c. Examples – classical linear regression model, non-linear regression, heteroskedasticity
d. Computational Aspects – see the topic on Numerical Optimization

e. The Cramer-Rao Lower Bound

f. Properties of MLE

4. Test Procedures and Model Selection. Chapter 16 (section 16.6).
   a. Test Procedures – Specification tests, Misspecification tests, Non-Nested tests, Predictive tests
   b. Specification Tests – Derivation of the Likelihood Ratio (LR) Test, the Lagrange Multiplier (LM or Score) Test, and the Wald Test

Homework Assignment 2:
   Questions:
   Due Date:

   a. Orthogonality Conditions implied by Economic Theory
   b. GMM estimator; Optimal Distance (Weighting) Matrix;
   c. Computation of the GMM estimator; Distribution of the GMM estimator;
   d. Test for Over-Identifying Restrictions

Homework Assignment 3:
   Questions:
   Due Date:

   a. Non-Scalar Identity Covariance Matrix
   b. Covariance Matrix under Pure Heteroskedasticity; Weighed Least Squares (WLS) – a Special Case of GLS
   c. Feasible and Infeasible GLS
   d. Distribution of Feasible and Infeasible GLS Estimators; The t- and F-test Statistics

   a. Examples of Systems of Equations
   b. Separate Estimation of Individual Equations by OLS
   c. Joint Estimation of All Equations under Independence of Cross Equation Errors – Equivalence of OLS and GLS
   d. Joint Estimation when Cross Equation Errors are Correlated – GLS and Feasible GLS
   e. Testing Cross Equation Error Correlation and Cross Equation Parameter Restrictions

Homework Assignment 4:
Questions:
Due Date:

   a. Examples – Demand / Supply Systems; Normalization; Classification of
      Variables – Endogenous (jointly determined), Exogenous, &
      Predetermined Variables
   b. Problems with OLS Estimator – Simultaneous Equations Bias
   c. Structural and Reduced Form Equations; Structural and Reduced Form
      Parameters
   d. Identification – Over-, Under-, and Exactly Identified Systems
   e. Estimation – Indirect Least Squares, Instrumental Variables Method, Two
      Stage Least Squares, Three Stage Least Squares
   f. Effects of Normalization on Parameter Estimates

Homework Assignment 5:
Questions:
Due Date:

**Academic Misconduct**

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.