Institute of Business Administration, Karachi

ECO343: Applied Econometrics I
Fall Semester 2024

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Course Description:
This course offers an introduction to the theory and application of econometrics. The course focuses on econometric analysis with cross-sectional data. The course involves estimating the parameters of econometric models, providing diagnostic tests, interpreting the results, and making use of the estimated models for prediction and testing some theory in economics. After successful completion of the course, students will be able to carry out quantitative and econometrics analysis of real-world problems in economics and other relevant fields that involve modeling relationship among variables, testing theory, and generating predictions from the model.

Course Objectives:
- To develop a sound foundation of econometric theory, models, and methods.
- To develop an ability to interpret and critically evaluate the outcomes of empirical analysis.
- To develop an ability to use software for estimation of the models relating economic variables and their interpretation.
- To prepare for advanced level econometrics courses and research.

Course Learning Outcomes
- A broad knowledge of econometric analysis relevant for analyzing economic data.
- Interpretation and critical evaluation of the outcomes of empirical analysis.
- Elementary procedures for model validation in the single equation context.
- Theoretical background for the standard methods used in empirical analyses, like properties of least squares estimators and the statistical testing of hypothesis.
- Use Stata computer package for econometric analysis.
- Apply Stata in analyses of empirical data.
- Perform statistical tests to investigate whether the classical assumptions in econometric analysis are satisfied.
- Be a critical reader of the literature concerning empirical analysis.

Grading:
The course will be graded on the basis of the following components and weights.

Assignments: 20%
Class/Lab participation: 10%
Mid Term Exam:30%
Final Exam: 40%

- The grading of this course will be absolute as per the standard grading plan of IBA.

- Assessment will be based on the material covered in class lectures and labs. Sometimes the lectures and lab sessions will go beyond what is covered in the books. Attending classes and labs is therefore very important.
- Students should have notebook and pen during the class and lab.
- If any assignment or report is submitted after the deadline ('Due Date' in LMS), 1 mark will be deducted for each day of late submission (till 'Accept Until' in LMS).
- **Academic conduct, Attendance Policy, Plagiarism Policy and Course Withdrawal Policy**: Refer to IBA's policies, code of conduct and guidelines. Students must abide by them.

Text Book
Wooldridge, J. M. 2020. Introductory Econometrics: A Modern Approach. 7th edition.

- Reference Books:

- Hill, R.C; Griffiths, W.E, and Lim, G.C. 2018. Principles of Econometrics. 5th Edition.
- Stock, J. H., & Watson, M. W. (2018). Introduction to econometrics (4th ed.). Pearson. (SW)
- Gujarati, D. N., & Porter, D. C. (2020). Basic econometrics (6th ed.). McGraw-Hill Education. (Gujrati)
- Baum, C. F. (2011). An introduction to modern econometrics using Stata (4th ed.). College Station, TX: Stata Press.

Additional readings and handouts will be referred.

Data, description/definition of variables, and other resources:

https://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781305270107

http://www.principlesofeconometrics.com/

http://fmwww.bc.edu/gstat/examples/wooldridge/wooldridge.html

https://www.stata.com/links/resources-for-learning-stata/

Course Plan:

Serial #	Topics	Reference of **Wooldridge book**
1	Introduction to Econometrics Data types. Population, parameters, sample, estimators, estimates, expected value, variance, standard deviation, standard error, sampling distribution. Importance of causality Introduction to Stata with lab exercises	Ch 1 Appendix C

2	The Simple Regression Model • Gauss Markov Assumption • Gauss Markov Theorem with proof showing OLS to be BLUE • Estimating the SLR parameters using OLS and Method of Moments • Fitted values and residuals. • Goodness of Fit	Ch 2

3	Multiple Regression Analysis: Estimation
	• Mechanics of Ordinary Least Square Method
	• Interpretation of OLS estimates
	• Gauss Markov Assumptions and Theorem for MLR
	• The Expected Value of the OLS Estimators
	  o Omitted Variable Bias
	• The Variance of the OLS Estimators
	  o Multicollinearity
		Ch 3

4	Multiple Regression Analysis: Inference • Single restriction- T-test (one-sided and two sided) • Linear Combination of Parameters • Multiple restrictions-F-test • P-values • Confidence Intervals • F-test and R-square • Reporting results	Ch 4
5	Multiple Regression Analysis: OLS Asymptotic • Consistency • Asymptotic Efficiency	Ch 5
6	Multiple Regression Analysis: Further Issues • Data Scaling • Functional forms • Selection of regressors	Ch 6
7	Multiple Regression Analysis with Qualitative Information • Dummy variables • Interaction terms • Linear probability model • Policy Analysis and Program Evaluation	Ch 7
8	Heteroskedasticity • Consequences of Heteroskedasticity for OLS • Heteroskedasticity-Robust Inference after OLS Estimation • Testing for Heteroskedasticity • Weighted Least Squares Estimation	Ch 8
9	More on Specification and Data Issues • Functional Form Misspecification	Ch 9

	• Using Proxy Variables for Unobserved Explanatory Variables • Properties of OLS under Measurement Error • Missing Data, Nonrandom Samples, and Outlying Observations	

Note: Chapters from other books and handouts will also be referred.