



Lincoln University

BA 241 – Quantitative Analysis

COURSE SYLLABUS

Fall 2020

- Instructor:** Professor Themis D. Pantos, Ph.D.,
Lecture Schedule: Tuesday, 12:30-3:15 pm.
Credits: 3 units / 45 lecture hours
Level: Advanced (A)
Office Hours: Monday: 1:00-4:00 pm.
e-mail: tpantos@lincolnuca.edu
Phone: (510) 250-6113
- Textbooks:** Damodar J. Gujarati and Dawn C. Porter. (2009). Essentials of Econometrics. Irwin/McGraw Hill, fourth edition, ISBN-10: 0073375845, ISBN-13: 9780073375847
Robert S. Pindyck and Daniel L. Rubinfeld. (2000). Econometric Models & Economic Forecasts, 4th edition. New York, NY. McGraw Hill, ISBN-10: 0071188312, ISBN-13: 978-0071188319.

Themis D. Pantos, Instructor's Notes, Lincoln University, Fall 2020.

Other recommended textbooks:

Recommended: William H. Greene "Econometric Analysis", 7th edition, Prentice Hall, 2011.

Jack Johnston and John Di Nardo "Econometric Methods", 4th edition, Irwin/ McGraw Hill 1997

Last Revision: August 19, 2020

CATALOG DESCRIPTION:

This course covers quantitative techniques for solving business problems and making management decisions. Techniques include production or output planning, capital investment and project analysis, linear and non-linear programming, probability theory, inventory control, scheduling, and waiting line models, as well as mathematical decision techniques. (3 units)

Prerequisite: BA 115

EDUCATIONAL OBJECTIVES:

This is an advanced course and a special opportunity. It is essential for a student who takes on a quantitative dissertation in Finance or any other field, and for any student who wants to gain required skills in data science. It is particularly intended for top students with very good mathematical / statistical skills who are ready to work very hard to gain advanced knowledge in Mathematics, Statistics, and Economics. It is a very brief and intense course with very well defined goals. Simply stated, for conducting any empirical practical study in any field of Economics and Business, basic understanding of Econometrics is a must at school and in the work place. The course is likely to save time for students interested in an empirical DBA projects and thesis.

This course focus on quantitative analysis in econometrics. Econometrics is a specialized area of statistics which deals with the measurement of economics and business data. It is broadly applied in business and industry. It requires the application of economics and business theories and use of dedicated statistical software. This application can easily be learned with the aid of personal computers. The study of econometrics addresses the unique features of stochastic behavior which characterize Business and Economics. For example, imbalanced Panel Data is often encountered in business. Multivariate data is observed for firms over the same time horizon, and the stochastic behavior may be associated with the period and firm respectively. Econometrics involves the study of multiple linear regression and time series analysis and forecasting. Its methods are tailored to deal with the departure of the economic and business behavior from the standard models of regression analysis. Economics, Finance, Marketing and other areas of business provide the theoretical underpinning which logically link variety of variables. To some extent Business and Economics also identify convenient functional forms for linking those variables, where the identified parameters have economics, finance, and marketing interpretations. However, often, the measurement involves variables with errors, and typically we encounter missing variables.

Typically, economics data exhibits the notion of Heteroscedasticity (i.e., error terms are not uniform and often depend on the size of the independent variables). Furthermore, economic relationships often exhibit serial correlation, which depends on time and location. For instance, errors in a focal dependent variable in one period are related to errors in preceding periods. These features affect estimation efficiency and forecasts accuracy. Similarly, misspecification of economic relationships is quite common as is measurement of independent variables with error. The problem is particularly important when we estimate parameters of a system of economic relationships. These features affect both parameter estimation and identification.

Finally, of great important in economic and finance is the time series analysis where we try to estimate and forecast in the context of dynamic relationship. Here special tools have been developed for identification and forecast of time series. Due to the great diversity in student statistical and mathematical programs in class we will be using several textbooks in teaching econometrics from the elementary and modern textbook of Gujarati and Porter to the classic Johnston and Di Nardo respectively. Typically, the veteran books have more fundamental exposition and would suit the interest of the advanced students in class. I hope to provide individual guidance in your reading. Pindyck and Rubinfeld text would provide the basic skeleton for the exposed topics.

METHODOLOGY:

Both scalar and Matrix exposition would be taught and used. The course is based on lecture and homework. The homework would be both theoretical and empirical employing statistical software and actual data. In every homework and assignment, a communication presenting short description of the nature of the assignment and its lessons must be presented as an essential part of the submitted homework, or any other assignment. An econometric study (project) would be assigned. Both individual and group homework may be assigned. The range of this homework and project would depend on the range of available statistical software. I would like to emphasize the importance of the quality of the research project and its presentation by the student. This research project must be of high quality. Students are thus expected to dedicated considerable time to the project. As software we will use EViews. However, there are costly other programs TSP, MATLAB, SPSS and SAS, which are available for students and industry for a fee. I would be glad to guide any individual student who has access to any of this program in its use.

Assignments and projects require students to actively use resources of the library. Detailed guide to business *resources of the library* as well as the description of Lincoln University approach to *information literacy* are available at the [Center for Teaching and Learning](http://ctl.lincolnuca.edu) website (ctl.lincolnuca.edu).

COURSE LEARNING OUTCOMES¹

As a result of this course the student should be able to:

	Course LO	Program LO	Institutional LO	Assessment Activities
1	Demonstrate ability of modeling business and economics relationships based on economics and business theories.	PLO 1	ILO 1a, ILO 2a, ILO 3a	Homework, case analysis
2	Understand the assumptions of the classical Linear Multiple Regression model, and the departure in econometrics from these assumptions.	PLO 2	ILO 1a, ILO 6a,	Homework, case analysis
3	Gain familiarity with transformation of economics models.	PLO 3	ILO 2a, ILO 7a.	Homework, case analysis
4	Demonstrate ability to estimate parameters of the Linear multiple Regression model, how to test hypotheses regarding the parameters values, and how to forecast based on linear regressions models.	PLO 4	ILO 1a, ILO 2a, ILO 5a.	Homework, case analysis
5	Gain experience in computer processing of econometric data.			Homework, case analysis
6	Demonstrate ability to estimate the biased effects of errors in variables on the estimated variable and how to use			Homework, case analysis

¹ Detailed description of learning outcomes and information about the assessment procedure are available at the [Center for Teaching and Learning](http://ctl.lincolnuca.edu) website (ctl.lincolnuca.edu).

	instrumental variables to eliminate or minimize the bias.			
7	Demonstrate ability to test for serial correlation, estimate it and how to take advantage of the estimate in generating forecasts; and gain basic familiarity with Box-Jenkins ARIMA model.			Homework, case analysis
8	Demonstrate ability to deal with multicollinearity.			Homework, case analysis
9	Demonstrate ability to deal with identification and estimation problems of simultaneous economic relationships.			Homework, case analysis
10	Learn to appropriately choose and process cross sectional time series models.			Homework, case analysis
11	Conduct a business study (mini project) using econometrics methods.			Homework, case analysis

STUDENT CONDUCT:

- Please participate. What you put into the class will determine what you get out of it – and what others get out of it.
- Please come **Online on Time**. Plan to stay during the whole class period. Attendance may be taken at least one time in of each class. Attendance is a component of the overall grading.
- If you miss a class, you are responsible for getting notes/slide printouts on the material covered from a classmate in your group.
- To avoid distracting noise in class, cellular phones **must** be turned off or the ringing mode silenced.
- During an exam or a review of an exam all recording devices of any form must be closed and stored in closed bags. (See also Examination Policy).

GRADE ASSESSMENT:

Your performance in this course will be evaluated under the following Grading Scale Model

Assignments:	20%
Midterm Examination:	30%
Final Examination:	50%
Total	100%

There will be NO “make-up credit” or extra credit work during and after the semester. The instructor reserves the right to modify the grading system based on class performance and notification to the students about any change during the semester. You are responsible for keeping apprised of any change in syllabus. If you plan to be sick on exam days, please do the exam a day earlier before getting sick. The key to success in this course is communication and interaction.

Thus, we will have to work as a team. First, we will create a positive learning environment where everyone can participate without fear. Second, relevant reading and problem assignments will be presented and discussed in class. When in doubt, ask.

Scholastic Dishonesty

Scholastic dishonesty will not be tolerated. Students who violate rules of academic dishonesty are subject to disciplinary penalties, including failure in the course and/or other actions from the University.

GRADING SCALE:

The grade will be based on a curve, reflecting the standards of Lincoln University. The following table details the satisfactory cut points for the grade, and the corresponding grade.

Course Points	Grade
93-100	A
89-92	A-
85-88	B+
80-84	B
75-79	B-
70-74	C+
65-69	C
60-64	C-
55-59	D+
50-54	D
Below 54	F

COURSE SCHEDULE:

We will focus on elements in the following Chapters in Robert S. Pindyck and Daniel L. Rubinfeld, *Econometric Models & Economic Forecasts and Instructor's Notes*.

Dates	Topic	Chapters
Week 1:	<i>Introduction and Quantitative Tools</i>	Chapter 1
Week 2:	<i>Introduction to Linear Regression</i>	Chapter 2
Week 3:	<i>Linear regression with one and two independent variables</i>	Chapter 3
Week 4:	<i>Criteria for statistical estimates and inference</i>	Chapter 6
Week 5:	<i>ANOVA and the Classical OLS BLUE Estimates</i>	Instructor Notes
Week 6:	<i>Probability, Hypotheses Testing and Type 1 and 2 Errors</i>	Instructor Notes
Week 7:	<i>The Classical Multiple Regression Model</i>	Chapters 4&5
Week 8:	Midterm Examination	
Week 9:	<i>Dummy Variables and Event Methodology</i>	Chapter 7
Week 10:	<i>Heteroscedasticity and Serial Correlation</i>	Instructor's Notes
Week 11:	<i>Errors in Variables and Missing variables</i>	Chapter 8
Week 12:	<i>GLS and Instrumental Variable Models</i>	Instructor's Notes
Week 13:	<i>Simultaneous Equations</i>	Chapter 11
Week 14:	ARIMA and GARCH Models	Chapters 16&17
Week 15:	Final Examination	