

**University of Piraeus**  
**Department of Economics**  
**Master of Economic and Business Strategy**

**Methods of Analyzing Uncertainty**  
**(Μέθοδοι Ανάλυσης Αβεβαιότητας)**

Fall Semester 2021

**Instructors Information:**

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**Course Description**

The current course will provide a thorough presentation of quantitative analysis used in Economics/Finance to empirically identify the behavior of any economic/financial phenomenon. The first part will concentrate on the problems that appear in regression analysis along with classical issues that produce misleading results, as well some special topics. The second part will provide the tools and empirical applications with case studies in all of the above topics, as well as covering issues with panel data. For this purpose the use of statistical software will be taught. Hence, the course is very important because it will help students to understand how econometrics works and can be used for analyzing real economic/financial issues. The methods that students will learn in this course will allow them to implement advanced quantitative analysis for modeling and forecasting, tools that are useful in the decision making process.

**Course Prerequisites**

The course will be taught in a self-contained way and therefore all materials needed for a good understanding of the concepts of this course will be presented in class. Students do not need to worry about their statistical or econometric background. The

course will provide brief reviews of background concepts and small proofs when needed.

## Textbooks

The following textbooks provide a good coverage of most of the topics presented in this course and they are strongly recommended in order of importance:

- Greene, W. H., *Econometric Analysis*, Prentice Hall, 2003.
- Johnston, J. and Dinardo, J., *Econometric Methods*, McGraw Hill, 1997.
- Newbol, P., Carlson, W. L. and Thorne, B. *Statistics for Business and Economics*, 6th edition, Pearson Prentice Hall, 2006.
- McClave, T. J., Benson, P. G. and Sincish, T., *Statistics for Business and Economics*, 9th edition, Prentice Hall, 2005.
- Mills, T., *The Econometric Modeling of Financial Time Series*, Second Edition, Cambridge University Press, 1999.
- Pindyck, S. R. and Rubinfeld, L. D., *Econometric Models and Economic Forecasts*, McGraw Hill, 1998.
- Watsham, J. T. and Parramore, K., *Quantitative Methods in Finance*, International Thomson Business Press, 1997.
- Frank Fabozzi, and Franco Modigliani, 1996, *Capital Markets, Institutions and Instruments*, 2<sup>nd</sup> editions, Prentice Hall International, New Jersey, ISBN: 0-13-509093-8.
- Bodie, Z., A Kane, and A Marcus, 1996, *Investments*, 3<sup>rd</sup> edition, Irwin.

In addition, lecture notes will be distributed to all of you as the course progresses for every subject covered in class. **However, you should understand that these lecture notes cannot, in any way, substitute a textbook.** The lecture notes are written in a way to assist you understand better the material covered in class.

## Grading Procedures

There will be only one exam on this course.

## Course Outline

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### I. INTRODUCTION

1. What is Econometrics?
2. How Econometrics Works
3. Review on Regression analysis

### II. PROBLEMS IN REGRESSION ANALYSIS

1. Multicollinearity

2. Heteroscedasticity
3. Autocorrelation
4. No normality
5. Omitted variables

### III. ISSUES IN REGRESSION ANALYSIS

1. ARCH models
2. Dummy variables
3. Distributed lag models
4. Errors in variables (Expectations - Proxy variables - Instrumental variables)
5. Non-linear models
6. Estimating Demand Elasticities
7. Granger Causality

### IV. ISSUES IN FINANCIAL TIME SERIES

1. Financial Time Series
2. Unit Root and non stationary issues
3. Random walk model
4. Cointegration analysis

### V. APPLICATIONS IN FINANCIAL RISK MANAGEMENT

1. Introduction to STATA/R
2. Applications to OLS
3. Cases in issues in OLS
4. Special topics for Economics/Financial related regressions
5. Panel Data Regression
6. Fixed vs Random Effects