# Econometrics

**Course Outline**
**Academic Semester: 2025/26**

## 1. General

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|---|---|---|---|
| School | **School of Finance and Statistics** | | |
| Academic Unit | **Department of Banking and Financial Management** | | |
| Level of Studies | **Undergraduate** | | |
| Course Code | **XPOIM01** | | |
| Semester | **4th** | | |
| Course Title | **Econometrics** | | |
| Idependent Teaching Activities | | Weekly Teaching Hours | Credits |
| | **Lectures** | **4** | **7,5** |
| Course Type | **Scientific expertise** | | |
| Prerequite Courses | | | |
| Language of Instruction and Examinations | **Greek** | | |
| Is the course offered to Erasmus Students? | **Yes (in English and Greek)** | | |
| Url (Eclass) | **https://eclass.unipi.gr/courses/XTD174/** | | |

## 2. Learning Outcomes

### Learning Outcomes

**Upon successful completion of the course, the student**

a. will know the fundamental assumptions for the application of the linear model and its estimation by the method of least squares, but also by alternative methods,
b. will be able to interpret the estimated parameters of the linear model as well when the logarithm of an explanatory or dependent variable is used. It will also be able to draw conclusions from the standard tables produced by econometric software packages,
c. will be aware of the effects of violating the classical assumptions, such as when there is heteroscedasticity, multicollinearity or when an explanatory variable has been omitted,
d. will be able to test for heteroscedasticity and know how to deal with it;
e. will be able to use dummy variables and interpret the estimated coefficients,
f. will know the purpose and basic properties of important non-linear models (probit, logit),
g. will know the basic principles of the Instrumental Variables method for treating the problem of endogeneity,
h. will have a first contact with the R language. In this framework, the student will learn how to insert data from files, and the basic functions in R, which are needed for data processing and in applications of the taught econometric methods.

### General Competences

Within the framework of the combined skills that the graduate will acquire by attending all the courses of the study program, this course aims at the graduate to acquire abilities:

a. in the search for, analysis and synthesis of data and information, with the use of the necessary technology,
b. in decision-making

c. in working independently
d. to promote free, creative and inductive thinking
e. in exercising criticism and self-criticism

## 3. Syllabus

The course focuses on the following sections:

1. Introduction to Linear Regression
    - The nature of Econometrics
    - The statistical generating mechanism and regression models.
    - Linear regression models, simple regression models, the classic multiple regression model.
    - The Simple Linear Regression Model

2. The classic assumptions.
    - Least squares estimators, sample moments estimators, method of moments.
    - Properties of estimators, Gauss-Markov theorem, distributions of estimators.
    - Multiple Regression Analysis

3. The case of k independent variables
    - Interpreting the least squares regression equation
    - Expected value and variance of least squares estimators
    - Hypothesis testing and confidence intervals
    - Checking multiple linear constraints
    - Asymptotic properties of least squares: Consistency and efficiency of estimators
    - Consequences of multicollinearity
    - Heteroscedasticity

4. Implications for the least squares estimator
    - Heteroscedasticity “robust” inference
    - Testing for Heteroscedasticity
    - Weighted and Generalized Least Squares

5. Regression Analysis with Qualitative Information: binary (or dummy) variables
    - Regression with one dummy (binary) variable
    - Dummy variables for multiple categories
    - A binomial dependent variable: the linear probability model

6. Special issues
    - The Probit and Logit models
    - Endogeneity and the method of Instrumental Variables

    During the course there will be an presentation of the R language and the interface RStudio, including:
    - Basic R functions for data manipulation
    - Examples are presented using the appropriate R functions for regression analysis, according to the course outline.

## 4. Teaching and Learning Methods - Evaluation

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| Delivery | **In-class lecturing** |
| Use of Information and Communications Technology | **Powerpoint presentations, presentation of R and RStudio, use of the e-class platform.** |

**Teaching Methods**

| Activity | Semester Workload |
|---|---|
| Lectures | 52 |
| Independent Study | 135,5 |
| **Course Total** | **187,5** |

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| Student Performance Evaluation | Formative and conclusive evaluation is carried out. The final evaluation of the students is done by a written exam or an oral exam. It is based on problem solving, short-answer questions and open-ended questions. |

## 5. Attached Bibliography

### Suggested Bibliography


1. Introductory Econometrics: A Modern Approach, 6th edition (J. Woodrifge) – Greek edition, Papazisis ed.)
2. Unified Quantitative Methods in Economics, N. Pittis (in Greek), Diplographia ed.
3. Tutor's Notes


### Related Academic Journals

Econometric Reviews, Econometric Theory, Journal of Econometrics, Journal of Applied Econometrics