Syllabus "Econometrics I" Code: 102308

ECTS: 6

Degree	Year	Semester
2501572 Administració i Direcció d'Empreses	2	2
2501573 Economia (EHEA Degree)	2	2

Contact

Language

English

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Prerequisites

It is highly recommended that the student has already passed the courses of *Mathematics I*, *II* and *Statistics I*, *II*. Having mastery of the materials presented in these courses is essential to succeed in *Econometrics I*.

Objectives

Econometrics I focuses on the study and application of the linear regression model, the basic tool in empirical analysis. The course begins with the simple regression model, already introduced in *Statistics II*, and continues with the multiple regression model, including both quantitative and qualitative regressors.

The goal of this course is to ensure that the students learn how to extract information about relationships between economic variables using basic regression analysis, being able to rigorously assess the advantages and limitations of this tool. Major emphasis will be placed on understanding the intuition behind the general theoretical aspects of econometric analysis. Throughout this course numerous applications using real data and econometric software will be presented so that students learn to value the empirical applications of the tools introduced.

This course provides the fundamentals for the analysis of economic data which continues with the courses of *Econometrics II* and *Econometric Models and Forecasting*.

Competences

- Apply basic statistics for improving the analysis and systematization of business information rigorously and scientifically.
- Ability for adapting to changing environments.
- Ability for oral and written communication in English, which enables the synthesis, oral and written presentation of the work to be carried out.
- Ability for independent learning in the future, gaining more profound knowledge of previous areas or learning new topics.
- Demonstrate initiative and work individually when the situation requires it.
- Identify and apply econometric methodology for the empirical analysis of economic data.
- Organize the work in terms of good time management, organization and planning.
- Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.

- Select and generate the information necessary for each problem, analyze it and take decisions based on that information.
- Use of the available information technology and adaptation to new technological environments.

Learning outcomes

- 1. Search financial information from various sources: databases, Internet, etc.
- 2. Capacity for adapting to changing environments.
- 3. Capacity for oral and written communication in Catalan, Spanish and English, which enables synthesis and oral and written presentation of the work carried out.
- 4. Capacity for independent learning in the future, gaining more profound knowledge of previous areas or learning new topics.
- 5. Demonstrate initiative and work individually when the situation requires it.
- 6. Identify improvements in the internal management process to simulate company productivity.
- 7. Initiative and work individually when the situation requires it.
- 8. Organize the work in terms of good time management, organization and planning.
- 9. Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.
- 10. Prepare data obtained from sources for quantitative analysis
- 11. Select and generate the information necessary for each problem, analyze it and take decisions based on that information.
- 12. Use of the available information technology and adaptation to new technological environments.
- 13. Use computer programs to analyze quantitative data.

Course contents

Unit 1: Introduction to econometric analysis

- What is econometrics? Objectives.
- Nature and structure of economic data.
- Causality versus correlation. The notion of ceteris paribus.

Unit 2: The simple regression model

- The simple linear regression model. The regression line.
- Least squares estimation. Derivation of the least squares estimator (OLS). The fitted regression line.
- Goodness of fit. The coefficient of determination.
- Numerical properties of the estimator.
- Distribution of the estimator under classical assumptions.
- Statistical properties of the estimator.
- Applications.

Unit 3: The multiple linear regression model: estimation

- The linear regression model with K regressors.
- OLS estimation. Fitted model.
- The coefficient of determination and the adjusted coefficient of determination.
- Regression model and functional form.
- Distribution and properties of the estimator under classical assumptions.
- The components of the variance of the OLS estimator.
- Estimation under the presence of collinearity.
- Applications.

Unit 4: The multiple linear regression model: inference

- Hypothesis testing and confidence intervals using the t statistic. Individual significance test. Confidence intervals for a single regression parameter.
- Hypothesis testing using the F statistic. The F statistic using restricted least squares estimation. Global significance test.
- The use of dummy variables. Testing for structural change.
- Inference under the presence of collinearity.
- Applications.

Methodology

The course will be structured as follows:

1. Classroom lectures

In the classroom lectures, the key concepts and methods will be presented using examples to facilitate a clear understanding of the materials.

2. Computer room lectures

In order to demonstrate the different econometric concepts and methods some lectures will take place in the computer room. The econometric package *Gretl*, an open source software program, already used in *Statistics II*, will be used extensively.

3. Problem solving and applications

There will be a problem set for each chapter and it is expected that students will work independently. This activity is crucial to assimilate both, the theoretical aspects and the applications of the tools presented. The instructor will selectively choose exercises from the problem sets which will count towards the students grade, although students are expected to complete the entire problem set. Also, some of the problem set exercises might appear as part of the midterm and final exams.

4. In class problem solving and applications

The aim of this activity is to discuss and solve some especially interesting or difficult exercises in class. This will help student understand and correct any errors they may have had while working on their problem sets.

5. Instructors office hours

Students can use instructor's office hours to ask questions and get additional help. Office hours will be announced in either *Campus Virtual* or on the instructor's web page.

6. Studying

It is expected that the class activities 1, 2 and 4, described above, will take about one third of the time the student is supposed to dedicate to *Econometrics I*. Students should anticipate spending 100 or more hours of independent work outside the classroom (problem solving, studying class notes and textbook,....) in order to succeed in this course.

Important :

- To successfully pass this course, class attendance is critical.
- For a good class environment: Everybody should be punctual and plan on staying for the entire class.
- For a good class environment: Mobile phones should be off during lecture time.

Activities	Hours	ECTS	Learning outcomes
Type: Directed			
Problem solving and applications	15	0.6	1, 6, 10, 13
Classroom lectures	30	1.2	2, 6, 9, 11, 12
Type: Supervised			
Computer room	7	0.28	2, 6, 7, 8, 9, 10, 11, 12, 13
Type: Self learning			
Studying	90	3.6	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Assessment

Students grades will be calculated as follows:

1. Midterm exam on Unit 1 and 2 (MIDTERM 1)

Closed book exam. Grade will be given on a scale from 0 to 10. This exam will represent 10% of the overall grade.

2. Midterm exam on Unit 1, 2, 3 and 4 (MIDTERM 2)

Closed book exam. Grade will be given on a scale from 0 to 10. This exam will represent 20% of the overall grade.

3. Final exam on Unit 1, 2, 3, 4 and 5 (FINAL)

Closed book exam. Grade will be given on a scale from 0 to 10. This exam will represent 60% of the overall grade.

4. Submission of homework sets and papers (HOMEWORK)

Occasionally, each student will be asked to submit some exercises from the exercise set. Grade will be given on a scale from 0 to 10. Assignments will represent 10% of the overall grade.

After each grading activity, grades will be posted either in Campus Virtual or in the instructor's web page. The date and place for each exam review will also be posted in the same manner.

Grading:

a. After the final exam grade is available, a course grade will be given to each student. As explained, the course grade is calculated according to the following expression:

COURSE GRADE=0.1*MIDTERM 1 + 0.2* MIDTERM 2 + 0.1*HOMEWORK + 0.6*FINAL

b. To pass the course a student's course grade should be greater or equal to 5.

c. All students must take exams and turn in assignments on their specified dates. No exceptions possible.

Assessment Calendar:

The dates for Midterm 1 and Midterm 2 will be announced well ahead of time. The date of the final exam is posted at the website of the *Facultat d'Economia i Empresa*.

Post-assessment:

For those students who have obtained a course grade greater or equal to 4 but smaller than 5, there will be a post-assessment make-up exam, whose form will be announced when the final degrees are published. This post-assessment exam will be scheduled in the *Facultat d'Economia i Empresa* exam calendar. This post-assessment exam has a PASS/NO PASS form. Students who pass the post-assessment exam will pass the course and will get a course grade equal to 5. The course grade of those students who do not pass the post-assessment exam will fail the course.

Assessment activities and learning outcomes:

Activity	Weight	Hours	ECTS	Learning outcome
Midterm Exams	30%	4	0.16	2,3,5,6,8,9,11,13
Final Exam	60%	4	0.16	2,3,5,6,8,9,11,13
Homework	10%	4	0.16	1,4,10,12

References

It is advised that students complement their lecture notes with readings from the following textbooks:

Gujarati, D., Basic Econometrics. 5 ed, 2010. McGraw-Hill.

Wooldridge, J. M., Introductory Econometrics: A Modern Approach. South-Western Cengage learning. 4ed. 2012.