

Degree	Type	Year	Semester
2501572 Business Administration and Management	OT	4	0
2501573 Economics	OB	3	1

## Contact

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## Use of languages

Principal working language: catalan (cat)  
Some groups entirely in English: Yes  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

## Prerequisites

It is highly recommended that the student has successfully completed Mathematics I, II, Statistics I, II and Econometrics I. Having full command of the materials presented in these courses is essential to succeed in Econometrics II.

## Objectives and Contextualisation

Econometrics II progress in the study and application of the linear regression model introduced in Econometrics I. After a brief review, the course introduces three deviations from the standard assumptions of the lineal model: heteroskedasticity, autocorrelation of the error terms and endogeneity of the explanatory variables. The students should learn the limitations of the classical model and how adapt this model and these methods for processing data associated with more general characteristics. For the same purpose it is introduced the maximum likelihood estimation method to allow the study of non-linear models, such that Logit and Probit Models. Throughout the course numerous examples using real data will be presented to help students to apply the introduced tools. We will put special emphasis to present the theoretical aspects in the most intuitive way. The main goal of this course is to provide students a deeper knowledge of the main econometric methods.

## Skills

### Business Administration and Management

- Apply the basic statistics for improving capacity for work in situations of risk, understanding their origins and developing possible strategies for reducing or mitigating their effects.
- Apply the basic statistics for improving processes of analysis and systematisation of business information and learn rigorously and scientifically about the company chain of value.
- Capacity for oral and written communication in Catalan, Spanish and English, which enables synthesis and oral and written presentation of the work carried out.
- Demonstrate initiative and work individually when the situation requires it.
- Identify and apply econometric methodology to respond to the problems that appear in the empirical study of some economic data.
- Select and generate the information necessary for each problem, analyse it and take decisions based on that information.
- Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.
- Use of the available information technology and adaptation to new technological environments.

- Value ethical commitment in professional practice.
- Work well in a team, being able to argue proposals and validate or reject the arguments of others in a reasoned manner.

### **Economics**

- Apply the basic statistics for improving capacity for work in situations of risk, understanding their origins and developing possible strategies for reducing or mitigating their effects.
- Apply the basic statistics for improving processes of analysis and systematisation of business information and learn rigorously and scientifically about the company chain of value.
- Demonstrate initiative and work individually when the situation requires it.
- Identify and apply econometric methodology to respond to the problems that appear in the empirical study of some economic data.
- Select and generate the information necessary for each problem, analyse it and take decisions based on that information.
- Take decisions in situations of uncertainty, demonstrating an entrepreneurial and innovative attitude.
- Use of the available information technology and adaptation to new technological environments.
- Value ethical commitment in professional practice.
- Work well in a team, being able to argue proposals and validate or reject the arguments of others in a reasoned manner.

## **Learning outcomes**

1. A capacity of oral and written communication in Catalan, Spanish and English, which allows them to summarise and present the work conducted both orally and in writing.
2. Analyse the performance of economic time series and make forecasts.
3. Assess ethical commitment in professional activity.
4. Demonstrate initiative and work independently when required.
5. Identify and apply the appropriate econometric methodology to respond to the problems appearing in the empirical study of some economic data.
6. Make decisions in situations of uncertainty and show an enterprising and innovative spirit.
7. Select and generate the information needed for each problem, analyse it and make decisions based on this information.
8. Specify models, estimation methods and inference.
9. Use available information technology and be able to adapt to new technological settings.
10. Use information technology programmes to perform a quantitative analysis of the data.
11. Work as part of a team and be able to argue own proposals and validate or refuse the arguments of others in a reasonable manner.

## **Content**

### **Unit 1: A review of the linear regression model**

- The main results
- Misspecification and criteria for model selection .
- Examples

### **Unit 2: Heteroskedasticity and Autocorrelation of the error term**

#### **Heteroskedasticity**

- The concept and the consequences for the OLS estimator
- Testing for Heteroskedasticity.
- Estimation
- Examples.

#### **Autocorrelation**

- The concept and the consequences for the OLS estimator

- Testing for autocorrelation
- Estimation and prediction in models with autocorrelation.
- Examples.

### **Unit 3: Endogeneity and the Instrumental Variables Estimator**

- Models with Endogenous Explanatory Variables
- The Instrumental variable Estimator.
- Dynamic regression models
- Examples.

### **Unit 4: Introduction to Time Series Models**

- Characteristics of Time Series
- Estimation Methods
- Examples.

### **Unit 5: Binary Choice Models**

- An introduction to Maximum Likelihood
- The Logit and Probit Models: Estimation
- Examples

## **Methodology**

The course activities will be structured as follows:

### **1. Lectures**

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

### **2. Computer room activities**

In order to better grasp 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 Econometrics I, will be used extensively. Students will learn additional advanced menu options and estimation methods..

### **3. In class problem solving**

There will be problems set for each unit and it is expected that students will work on them in groups or on their own. This activity is crucial to assimilate the theoretical aspects and the applications of the tools presented. The instructor will select some exercises from the problems set list to be discussed in class, although students are expected to complete the entire problems set in their own time.

### **4. Office hours**

Students can use instructor's office hours to solve specific questions. Office hours will be announced in either the intranet (Campus Virtual) or in the instructor's webpage.

### **5. Studying**

It is expected that activities 1 to 4, described above, take about one third of the time that the student is supposed to dedicate to Econometrics II. In order to succeed in this course, students should anticipate spending additional hours of independent work in problem solving and studying.

### **Important:**

-To successfully pass this course, class attendance is critical.

-For a good class environment: Everybody should arrive on time and plan on staying for the entire class.

## Activities

Title	Hours	ECTS	Learning outcomes
<b>Type: Directed</b>			
In class problem solving	15	0.6	2, 8, 5, 6, 7, 11, 9, 10
Lectures	30	1.2	2, 8, 5, 7, 9
<b>Type: Supervised</b>			
Computer lab activities	7	0.28	2, 8, 5, 4, 6, 7, 11, 9, 10
<b>Type: Autonomous</b>			
Studying and problem solving	90	3.6	2, 1, 4, 8, 5, 6, 7, 11, 9, 10, 3

## Evaluation

### Honor Code

Aside from other disciplinary measures that are considered appropriate, and according to the present

academic rules, students that copy from another's examination, solicit or give unpermitted collaboration during grading activities will be awarded with a zero. Furthermore, it will not be possible for them to sit for any further grading activity during the same academic year.

### 1. Midterm exam covering Unit 1 and 2

There will be a midterm covering the contents of Unit 1 and 2. It will be a closed book exam. Grades will be given on a scale of 0 to 10. This exam will represent 25% of the overall course grade.

### 2. Final exam

There will be a final exam covering the contents of Unit 1, 2, 3, 4 and 5. It will be a closed book exam. Grade will be given on a scale of 0 to 10. This exam will represent 60% of the overall course grade.

### 3. Submission of exercises

Occasionally, each student will be asked to submit some exercises. The instructor might ask students to solve these exercises during class, during an evaluation session or in the way he sees fit. Grades will be given on a scale of 0 to 10. Exercise solving will represent 15% of the overall course grade.

## Grading Policy

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

$$\text{COURSE GRADE} = 0.15 * \text{EXERCISES} + 0.25 * \text{MIDTERM} + 0.6 * \text{FINAL}$$

b. To pass the course the course grade should be at least 5.

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

d. If a student has not participated in any of the evaluations activities (midterm exam, final exam, submission exercises) receive a grade of "No evaluable"

### Assessment Calendar

The exam dates are set by the academic calendar of the Facultat d'Economia i Empresa.

### Grades and Exam Review

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

### 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 exam. The date of this post-assessment exam is established by the Facultat of Economia i Empresa and included in the exam calendar list. This post-assessment exam is of the PASS/NOPASS form.

### Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Final Exam	60%	2.5	0.1	2, 1, 4, 8, 5, 6, 7, 3
Midterm exam	25%	1.5	0.06	2, 1, 4, 8, 5, 6, 7, 3
Submission of exercises	15%	4	0.16	2, 1, 4, 8, 5, 6, 7, 11, 9, 10, 3

### Bibliography

Course textbook:

**Wooldridge, J. M.**, Introductory Econometrics: A Modern Approach. En castellà: Introducción a la Econometría, Cengage Learning.

Other books

**Gujarati, D.**, Basic Econometrics. 5 ed, 2010. McGraw-Hill. Darrera versió en castellà: Econometria. Quarta edició. 2004.

**Maddala, G.S.**, Introduction to Econometrics. 4ed, 2009. Wiley. Darrera versió en castellà: Introducción a la econometría, 2ed, 1996. Prentice Hall

**Verbeek, M.** A Guide to Modern Econometrics. 3ed, 2008. Wiley.