

## 27427 - Econometrics II

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 27427 - Econometrics II

**Faculty / School:** 109 - Facultad de Economía y Empresa

**Degree:** 417 - Degree in Economics

**ECTS:** 6.0

**Year:** 3

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:**

### 1. General information

### 2. Learning goals

### 3. Assessment (1st and 2nd call)

### 4. Methodology, learning tasks, syllabus and resources

#### 4.1. Methodological overview

The teaching method for the subject "Econometrics II" implies the use of different techniques aimed at the achievement of specific objectives.

The part of the subject that deals with more theoretical and methodological issues will be presented in lectures. In these sessions, the teacher will explain the main concepts of the econometric method, stressing economic interpretation and practical uses. That is, teachers will try to reduce theoretical issues to the minimum, and specific theoretical proofs and extensions will be provided to the students through the supporting material. To support knowledge in econometric method, and with the purpose of illustrating the use of the instruments previously studied, we will introduce regular theoretical-practical sessions in which the students, supported by the teacher, will solve small problems or study cases.

To stress the practical dimension of the subject, students will work with different software packages which deal with the search and use of useful statistical information and its treatment for econometric purposes. This work will be regularly distributed throughout the course in sessions specifically aimed at the use of econometric software.

Students are expected to participate actively in the class through the semester.

The teaching material that the teacher will offer to the students includes, sorted by units, some guides summarising the main concepts. Teachers will also provide students with some proposed study cases, which should be solved using the recommended software, as well as some additional material for those students who desire to extend their knowledge of Econometrics. All this information will be provided through the "Anillo Digital Docente" (ADD) of the University of Zaragoza. Further information regarding the course will be provided on the first day of class.

#### 4.2. Learning tasks

**The syllabus offered to students will help them to achieve the proposed goals and it consists of the**

## following activities:

**Theoretical sessions:** They make up, approximately, 50% of the teaching activities and they are aimed at presenting the main concepts of the subject, conveniently structured into units. The teacher will formally present the corresponding material, which students have to strengthen and extend using the recommended bibliography. We recommend students to attend lessons, participate, take notes about the teachers' explanations as well as asking about any doubts and further explanations they might need. Teachers will provide the students with all the necessary teaching material to enable them to properly understand this Econometrics course.

**Theoretical-practical sessions:** The teacher will provide students with a problem collection, as well as theoretical-practical questions related to the subject, well in advance. The main purpose of this material is for students to feel confidence with the use of all the instruments involved in the theoretical perspective of this Econometrics course. During the sessions, at least one hour every two weeks will be devoted to solving some of these questions, encouraging the participation of and discussion between the students.

**Practical sessions in the computer lab:** This activity will be developed in the computer rooms that the Centre has reserved for the subject. The objective is twofold. On the one hand, we aim at getting students used to managing large amounts of quantitative information, which is a key aspect for their skills. On the other hand, it is important for students to gain confidence in the use of econometric software, at user level. In these sessions, practical cases will be solved by the teacher, who will guide the students' learning process. The program used will be Gretl, since it is a free program that students can install on their computers, in case the classes have to be conducted online.

**Tutorial:** The teacher will schedule a tutorial calendar which will be published well in advance, with the objective of solving individual doubts and offering a more direct support to students.

The learning method is designed for sessions in a classroom. However, if it were necessary, due to the health situation, the sessions would be online.

## 4.3. Syllabus

### PART I. Extensions of the general lineal model

#### Unit 1. Sphericity analysis and use of models

- 1.1. Introduction
- 1.2. Heteroskedasticity
- 1.3. Autocorrelation
- 1.4. Normality
- 1.5. Use of models

### PART II. TIME SERIES ANALYSIS

#### Unit 2. Basic concepts: ARMA and ARIMA models.

- 2.1. Basic concepts of time series.
- 2.2. Concept of discrete linear stochastic processes.
- 2.3. Moving average processes (MA).
- 2.4. Autoregressive processes (AR).
- 2.5. Mixed autoregressive-moving average processes (ARMA).
- 2.6. Integrated processes (ARIMA ).

#### Unit 3. Box-Jenkins Methodology(I): General scheme and identification

- 3.1. General scheme of the Box-Jenkins Methodology.
- 3.2. Identification: detecting stationarity.
- 3.3. Identification: identification of the stationary ARMA structure.

#### Unit 4. Box-Jenkins methodology (II): Estimation, checking and forecasting

- 4.1. Model estimation
- 4.2. Model checking: Residual analysis
- 4.3. Model checking: Coefficients analysis and stability

#### 4.4. Forecasting

### 4.4. Course planning and calendar

#### Calendar of lessons and work presentation

The subject of Econometrics II has assigned a total of 150 hours (6 credits ECTS). The distribution of the lessons among the four units of the syllabus will depend on their complexity. In general terms, teachers will adopt the following schedule:

**Table 1.** Hours in Econometrics II

	<b>Unit 1</b>	<b>Unit 2</b>	<b>Unit 3</b>	<b>Unit 4</b>	<b>Total</b>
<b>Theoretical sessions</b>	7	8	8	8	30
<b>Blackboard sessions and computer lab sessions</b>	9	3	6	12	30
<b>Individual study</b>					30
<b>Total sessions</b>					150

(i)- During the first week of the course a special effort will be made to present the subject. For this purpose, typical cases and examples of study will be used. The objective is that the student has perfectly clear, from the beginning, which is the content of the subject, its purpose, the methodology to be used and the evaluation criteria.

(ii)- A normal week of the course consists of four hours of face-to-face classes, two of them will be devoted, unless there are abnormal circumstances, to present and discuss the theoretical content of the subject, the other two will be devoted to practice.

(iii)- The majority of these practical classes will be devoted to computer practices with the aim of familiarizing the student with the use of some of the typical computer tools in the field of econometrics, such as the Gretl program. Other practical classes will be devoted, when necessary, to the resolution in class of theoretical and practical exercises related to the subject.

(iv)- Throughout the course there will be two intermediate theoretical-practical tests; each of them will cover, approximately, each part of the course. These tests will be announced sufficiently in advance and will take place the first one, after the end of subject 1; and the second one in the period of continuous evaluation, after the end of the classes.

(v)- According to the calendar established by the Center, the student will take a global written exam during the exam period, where the acquired competences and skills will be evaluated. The date of this final exam will be communicated sufficiently in advance through the usual means of the Center.