

## 30609 - Statistics II

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 30609 - Statistics II

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

**Degree:** 432 - Joint Law - Business Administration and Management Programme

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject type:** Compulsory

**Module:**

### 1. General information

The main goal of this subject is that the student has the ability to apply and interpret the basic statistical tools for the understanding and management of random phenomena related to the economic field. They will have a preferably practical profile so that they can analyze, solve and interpret economic realities with the objective of making decisions with scientific rigor.

These approaches and goals are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 Agenda 2030 (<https://www.un.org/sustainabledevelopment/en/>), in particular, the activities planned in the subject will contribute to the achievement of goals 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) and 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and work. ).

### 2. Learning results

- Deepen the knowledge of the fundamentals, concepts and statistical methods for the analysis of economic realities economic realities.
- Understand and use probability as a measure of uncertainty in economic phenomena.
- Employ and plan sampling methods to extract information from an economic phenomenon.
- Know and apply inferential statistical techniques in order to make decisions with scientific rigor.
- Obtain, with the support of ICT, the statistical results necessary to estimate or contrast statements about the analyzed data, measuring the guarantees of the decisions taken.
- Infer and corroborate the properties of theoretical models from sample observations and justify the goodness of fit.

### 3. Syllabus

#### BLOCK 1. CALCULATION OF PROBABILITIES

Unit 1: Discrete random variable

Concept of random variable. Classification into discrete and continuous random variables. Probability distribution of a discrete v.a. and its characteristics. Notable Distributions.

Unit 2: Continuous random variable

Probability distribution of a continuous a.v. and its characteristics. Notable distributions.

#### BLOCK 2. INTRODUCTION TO SAMPLE THEORY

Unit 3: Introduction to Sample Theory

Basic concepts. Random sampling with and without replacement. Sampling distribution of a statistic. Determination of the sample size.

#### BLOCK 3. INFERENTIAL METHODS

Unit 4: Point and interval estimation

Concept of estimator. Point estimate. Interval estimation: pivotal method, Notable confidence intervals for the mean, variance and proportion.

Unit 5: Hypothesis testing

Basic concepts: hypothesis, significance level and power. Notable parametric contrasts. Nonparametric contrasts: normality contrasts.

#### BLOCK 4. TWO-DIMENSIONAL ANALYSIS

Unit 6: Two-dimensional inference

Analysis of two populations. Independent and paired samples. Statistical inference to compare means, proportions and variances. Analysis of categorical variables: Contingency tables.

## 4. Academic activities

Master classes: 30 hours

Practical classes: 30 hours

Personal Study: 85 hours

Assessment tests: 5 hours

6 ECTS = 150 hours

Lectures will be used to develop the concepts and techniques of each topic, using expository techniques, but encouraging participation and class discussion with students. Practical classes will be used to show the student how to approach and solve problems both in the classroom and in computer rooms using specific software.

In principle, the teaching methodology and its evaluation is planned to be based on face-to-face classes. However, if circumstances so require, they may be carried out online.

## 5. Assessment system

The subject will be assessed globally in both sessions.

### **Global Assessment:**

In the first call there will be two types of tests: the first will be through continuous monitoring questions (S) that will take place in class during the semester, and the other will be a written test (E) that will take place on the date of the official call of the subject.

The continuous follow-up questions (S) consist of the resolution of theoretical or practical questions that will be proposed in class at the end of each topic or thematic block. The number of continuous monitoring issues is estimated to range from 6 to 10. To pass these continuous monitoring questions the student must have presented at least 80% of the done in the group and the grade will be calculated by taking 80% of the best grades achieved. The grade of this test must reach at least three points out of 10 to be averaged with the written test.

The written test (E) consists of the resolution of practical problems and may be subdivided into two parts: one will be carried out in normal classrooms and the other will be carried out in computer classrooms using the software used in class. This written test (E) must have a grade of at least three points out of 10 to average with the continuous monitoring questions.

In the first call, there are two possibilities to calculate the final grade of the subject. **If the student participates and passes the continuous monitoring questions** the final grade will be  $\text{Final\_grade} = 0.25 \cdot S + 0.75 \cdot E$ . **If the student does not participate or does not pass the continuous monitoring questions** the final grade will be  $\text{Final\_grade} = E$ . To pass the subject, the student must obtain at least 3 points out of 10 in each of the tests (S) and (E) and a final grade equal to or higher than 5. Otherwise, he/she will have to present himself/herself at the second call for applications.

In the second call, the final grade will be calculated as the maximum of the two possibilities of the first call, that is,  $\text{Final\_grade} = \max\{0.25 \cdot S + 0.75 \cdot E, E\}$  if the student has participated and passed the questions of continuous monitoring. Otherwise,  $\text{Final\_grade} = E$ . In any case, the student must obtain at least 3 points out of 10 in each of the tests (S) and (E) and a final grade equal or higher than 5 to pass the subject.

### **Assessment Criteria:**

In the two tests (S) and (E), the approach, development, results and interpretation of the solutions to the problems proposed or the real situation analysed will be assessed.

It is foreseen that these tests will be carried out in person, but if circumstances require it, they will be carried out in a blended or online manner at . In the case of online assessment, it is important to note that, in any test, the student may be recorded, being able to exercise his/her rights through the procedure indicated in: [https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia\\_reducida.pdf](https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia_reducida.pdf).

The necessary tools will be used to check the originality of the activities carried out. When plagiarism or copying is detected in an activity, the assessment regulations approved by the center and the University of Zaragoza will be applied, if applicable.

## 6. Sustainable Development Goals

4 - Quality Education

8 - Decent Work and Economic Growth