

27419 - Statistics II

Syllabus Information

Academic year: 2024/25

Subject: 27419 - Statistics II

Faculty / School: 109 - Facultad de Economía y Empresa

Degree: 417 - Degree in Economics

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

The main objective 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. It will have a preferably practical profile so that they can analyse, 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: Goal 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), specially, sub-goals 4.4 (increase skills to access employment) and 4.C (improve teacher qualifications), and Goal 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment, and work) providing the theoretical and practical foundations to carry out more efficient data analysis that enables the achievement of said goals.

No prerequisites are required to take this subject, although it would be good to have passed Mathematics I and II and Statistics I of the first year.

2. Learning results

To deepen the knowledge of the fundamentals, concepts and statistical methods for the analysis of economic realities.

To understand and use probability as a measure of uncertainty in economic phenomena.

To employ and plan sampling methods to extract information from an economic phenomenon.

To know and apply inferential statistical techniques in order to make decisions with scientific rigor.

To obtain, with the support of ICT, the statistical results necessary to estimate or contrast statements about the analysed data, measuring the guarantees of the decisions taken.

Infer and corroborate the properties of theoretical models from observations of a random sample and justify the goodness of fit of the model to the information obtained.

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 random variable and its characteristics. Notable Distributions.

Unit 2: Continuous random variable

Probability distribution of a continuous random variable 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. INFERENCE METHODS

Unit 4: Point and interval estimation

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

Unit 5: Hypothesis testing

Basic concepts: hypothesis, significance level and power, pvalue. Notable parametric tests. Normality tests.

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

Lectures: 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. The practical classes will be used to show the student how to approach and solve problems using computer tools as developments in the regular classroom.

In principle, the teaching methodology and its evaluation is planned to be based on face-to-face classes.

5. Assessment system

The subject will be evaluated globally both in the first and second call.

In the **first call**, the evaluation will be based on two different tests: a theoretical-practical test and a practical test with a computer.

The **theoretical-practical test** consists of the resolution of problems and theoretical-practical questions similar to those solved in practical blackboard classes and master classes.

The computer-based practical test consists of solving problems using the statistical program RCommander as a calculation tool. This test can be passed individually during the term (P) or jointly in the final global test (FP). The grade P is given by the formula $P = (P1 + P2) / 2$, where P1 and P2 are the grades obtained in two midterm tests carried out throughout the term that will cover the practical part of topics 1 to 3 (test P1) and 4 to 6 (test P2), respectively. A minimum of 3 points must be obtained in each of them in order to be able to average these tests. If in the test P1 the student has obtained less than 3 points, they will have to take the final practical test PF in which they will be examined on all the topics of the subject.

The theoretical-practical test of the subject (T) will have a weight of 60% in the Final Grade and the practical test with computer (P or PF) will have a weight of 40%.

In first call there are two possibilities:

Students who only take the theoretical-practical test (T) and who have taken the test during the term (P) Students who take the complete test (T and PF) in the final exam

The final overall evaluation grade will be calculated as follows, provided that they have achieved at least a 3 on each of the two tests T and P or PF:

Final Grade = $0,6T + 0,4\max\{P,PF\}$ if $\min\{T, \max\{P,PF\}\} \geq 3$

Otherwise the final grade will be **$\min\{T, \max\{P,PF\}\}$.**

To pass the subject, the student must obtain a Final Grade greater than or equal to 5. If the Final Grade is less than 5, student must sit for the exam in the second call. This will be the same as the global test of the first call.

In the **second call**, the student must take the complete test (T and PF) and the final grade will be determined by the formula:

Final Grade = $0,6T + 0,4PF$ if $\min\{T,PF\} \geq 3$

Otherwise the final grade will be **$\min\{T,PF\}$.**

If a student has failed the first call but has passed (5 or more points) one of the two parts (theory or practice), the grade of the part passed will be saved for the second call as long as in the part not passed they obtains 3 or more points, not being necessary to retake the exam again.

6. Sustainable Development Goals

4 - Quality Education

8 - Decent Work and Economic Growth