

## 28711 - Statistics

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28711 - Statistics

**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia

**Degree:** 423 - Bachelor's Degree in Civil Engineering

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject type:** Basic Education

**Module:**

### 1. General information

This subject introduces the student to data processing at a practical level. You are introduced to the use of computer tools, covering aspects of data collection, presentation and analysis. The study of the uncertainty brings the student closer to the modeling of real situations and introduces them to the concept of process simulation. Finally, the basic concepts of statistical inference such as confidence intervals and hypothesis testing serve as a basis to analyze basic statistical techniques in the engineering profession. The final objective is that the student integrates the basic knowledge of this subject in all types of subjects related to their future professional practice.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to the achievement of the targets 4.4 and 4.5 of Goal 4, and target 9.5 of Goal 9.

### 2. Learning results

- Employ data processing and analysis techniques and use statistical software to summarize, classify and present the data.
- Is able to apply the fundamental concepts, applications and results of probability.
- Differentiate the basic concepts of unidimensional and multidimensional random variables and distinguish the different formulation between discrete and continuous random variables.
- Is able to choose the appropriate technique for the modeling of engineering environments under stochastic nature by means of random variables and to perform calculations under uncertainty.
- Argues the choice of estimators for a parameter and distinguishes between point and interval estimation.
- Knows the importance of analyzing the uncertainty around the parameter estimation.
- Pose statistical hypotheses and select the appropriate mathematical tool to make an acceptance or rejection decision.
- Is able to prepare, understand and criticize reports based on statistical analysis.
- Solve statistical problems of probability calculation and hypothesis testing using statistical software.
- Distinguishes between different probability models and is able to simulate them using appropriate statistical software.

### 3. Syllabus

1. Introduction to the statistical analysis language R
2. Descriptive Statistics
3. Probability Theory
4. Random variables
5. Distributions with own name
6. Multidimensional Random Variables
7. Reliability Theory
8. Linear Programming
9. Point and interval estimation
10. Hypothesis Contrasts
11. Multivariate linear regression

### 4. Academic activities

- Theoretical and practical master classes always in a computer classroom using algebraic and numerical manipulation

software.

- Participation checks with guided and collaborative problem solving.
- Written evaluation tests.
- Face-to-face and remote tutoring.
- Personal work.

## 5. Assessment system

- **Continuous assessment system**

To be eligible for continuous assessment it is necessary to attend at least 80% of the classroom activities.

The subject will be considered passed if 50% or more of the following score is obtained:

- Written tests: There will be two written tests on the content of the subject. Its weight in the final grade will be 70%.
- **Participatory controls:** There will be 6 guided and collaborative controls valued at 30% of the final grade, with problems or quizzes programmed through the ADD.

To add the grade of the controls to the final grade, the student must have obtained **at least 10 points out of 35** in each of the written tests.

### --Global assessment

-Those who have not passed the subject with the continuous assessment system