

## 30108 - Statistics

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 30108 - Statistics

**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia  
179 - Centro Universitario de la Defensa - Zaragoza

**Degree:** 425 - Bachelor's Degree in Industrial Organisational Engineering  
563 - Bachelor's Degree in Industrial Organisational Engineering

**ECTS:** 6.0

**Year:** 563 - Bachelor's Degree in Industrial Organisational Engineering: 2  
425 - Bachelor's Degree in Industrial Organisational Engineering: 1

**Semester:** 563 - First semester

425 - Second semester

**Subject type:** Basic Education

**Module:**

### 1. General information

The objectives of this subject are to introduce the student to the modeling of situations involving uncertainty and to provide tools for the statistical analysis of data sets by means of basic concepts of statistical inference.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the 2030 Agenda 2030 Agenda of the

United Nations (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the subject provides training and knowledge, skills and competencies to contribute to some extent to their achievement.

#### Defense Profile

- Goal 10: Reduction of Inequalities
- Goal 16: Peace, Justice and Strong institutions

#### Company Profile

- Goal 4: Quality Education

### 2. Learning results

In order to pass this subject, the students shall demonstrate they have acquired the following results:

1. Ability to apply data processing and analysis techniques.
2. Know the fundamental concepts, applications and results of probability.
3. Understand the concepts of unidimensional and multidimensional random variables.
4. Master the modeling of engineering environments under stochastic nature by means of random variables as well as the performance of calculations in and the performance of calculations under uncertainty.
5. Know the sampling and estimation techniques.
6. Know how to use statistical hypothesis testing and its application in decision making.
7. Ability to prepare, understand and critique reports based on statistical analysis.
8. Identify and formulate optimization problems.

### 3. Syllabus

#### Defense Profile

The subject is divided into two parts.

Block 1: Probability and random variables.

1. Calculation of probabilities.
2. Random variables.

Block 2: Exploratory data analysis and statistical inference.

1. Exploratory data analysis.

## 2. Statistical inference.

### Company Profile

The content of the subject is as follows:

- Descriptive statistics.
- Probability.
- Random variables and probability distributions.
- Introduction to reliability theory.
- Point and interval estimation.
- Parametric and nonparametric hypothesis testing.
- Multiple linear regression.

## 4. Academic activities

### Defense Profile

The activities of the course are distinguished according to whether they are face-to-face or non-face-to-face.

The face-to-face activities are:

1. Lectures.
2. Problem solving.
3. Use of computer tools.
4. Tutoring.
5. Performance of evaluation tests.

The non-face-to-face activities are:

1. Carrying out individual and/or group activities.
2. Self-study of the student.

### Company Profile

Since the subject consists of 6 ECTS credits, and each one of them consists of 25 hours divided into 10 hours of tutored work and 15 hours of independent work, the face-to-face learning activities (theoretical classes, practical classes and seminars) and continuous assessment activities (participation controls and written tests) will occupy 60 hours during the semester.

Other face-to-face activities such as personal tutorials and non-face-to-face activities ones such as study for the assimilation of concepts and techniques, practice for familiarization with computer tools, problem solving and exam preparation, will require 90 hours of autonomous work by the student. All these activities should add up to the 150 hours necessary to achieve the learning results of the subject.

The specific and complete planning of the course will be made known to the students at the beginning of the term. All evaluation activities will then be fixed, except for schedule adjustments that will be notified well in advance. Also from the beginning of the term the dates of the official calls will be fixed from the address of the center.

## 5. Assessment system

### Defense Profile

FIRST CALL

Continuous assessment:

1. Assessment instrument 1 (40% of the final grade): written test with questions on Block 1.
2. Assessment instrument 2 (40% of the final grade): written test with questions on Block 2.
3. Assessment instrument 3 (20% of the final grade): writing of a statistic report.

To pass the subject, the student must obtain a final grade greater than or equal to 5.

Global test:

Students who do not pass the subject by continuous evaluation or who would like to improve their grade, will have the right to take the overall test set in the academic calendar, prevailing, in any case, the best of the grades obtained. It will consist of a written test with theoretical and practical questions based on the contents of subject.

SECOND CALL

Global test:

Students who do not pass the course in the first exam may sit for this global exam. It will consist of a written test with theoretical and practical questions based on the contents of subject.

Assessment instruments:	Weighting	Learning results
1	40%	2, 3, 4

2	40%	5, 6, 7, 8
3	20%	1, 5, 6, 7

### Company Profile

At the beginning of the subject the student will choose one of the following two assessment methodologies:

- A **continuous assessment system**, which will be carried out throughout the entire teaching period.
- A global **assessment test**, reflecting the achievement of the learning results, at the end of the teaching period.

### Continuous assessment system:

Written tests: There will be two written tests along the term. They will deal with theoretical and/or practical aspects of the subject, their weight will be 60%. A **minimum grade of 3** on each written test is required for to continue with the continuous assessment:

Written test 1: It will take place on week 8 and will deal with the topics taught in the first 8 weeks of the subject.

Written test 2: It will be held on week 15 and will deal with the topics taught in the second half of the subject

Participatory controls: Throughout the course the student will carry out participatory controls valued as a whole in a 20% of the final grade, which will consist of the realization of practical exercises.

Applied work: Throughout the term, the student will carry out an applied work on the subjects of the subject, it weights 20% of the final grade.

**Global assessment test:** Students who have not passed the course with the continuous assessment system, must take a compulsory written test equivalent to the written tests described in point 1, whose weight in the final grade will be 80%. Likewise, they must submit the 2 applied papers required during the term.