Universidad Zaragoza

Academic Year/course: 2024/25

30008 - Statistics

Syllabus Information

Academic year: 2024/25
Subject: 30008 - Statistics
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 436 - Bachelor's Degree in Industrial Engineering Technology
ECTS: 6.0
Year: 1
Semester: First semester o Second semester
Subject type: Basic Education
Module:

1. General information

The subject is aimed at the applications of Statistics in Engineering: quality improvement and the design of new products and processes for which data processing is essential. The calculation of probabilities and random variables are illustrated with examples in system reliability, while quality control motivates the section on inference. The objective is the integration of the knowledge of Statistics in the context of the Degree for its practical application.

It is recommended to know the basic tools of integral and differential calculus.

2. Learning results

1. Handle the fundamentals of probability calculus and techniques in relation to probability distributions to identify the stochastic structure underlying the behavior of a real system.

2. Apply statistical data processing and analysis techniques to extract knowledge from the data.

3. Use computer programs for data processing.

4. Apply sampling and parameter estimation techniques. Raise and interpret hypothesis testing as a solid supportto the decision making process.

5. Prepare a statistical report that presents the problem under study, analyze the results critically, and propose recommendations in understandable language for decisionmaking.

6. Identify and formulate optimization problems.

3. Syllabus

EXPLORATORY DATA ANALYSIS

1. Exploratory analysis of one and several variables. Linear regression models.

2. Adjustment of distributions.

PROBABILITY DISTRIBUTION MODELS.

1. Introduction to the calculation of probabilities.

2. Random variables.

3. Usual discrete and continuous probability models.

4. Multivariate probability models.

SAMPLING, ESTIMATION AND HYPOTHESIS TESTING.

1. Sampling.

2. Point and interval estimation.

3. Hypothesis testing in one and two populations.

4. Contrasts for more than two populations. Design of experiments. Optimization.

4. Academic activities

Lectures: Theoretical-practical sessions in which the contents of the course are explained.

Practices in a computer laboratory: Resolution of practical cases with specific software.

Tutored work.

Personal study.

Assessment activities.

5. Assessment system

In order to pass the subject the student must obtain a final grade of at least 5 points out of 10 with the following activities and weightings:

1. Written test on the part of Probability Distribution Models. Assesses learning result 1 (35%).

2. Written test on the part of Sampling, estimation and hypothesis testing on the date of the official call. Assesses learning result 4 (30%).

Each of parts 1 and 2, require a minimum score of 4 (out of 10) a weighted average of at least 5.

Students who do not perform or do not reach the minimum in the test of point 1, will take a written test in the official call.

3. Formative assessment activities carried out during the term linked to the computer lab to assess the learning results 2, 3, 5 and 6. The student will have, alternatively, a written test on this point in the official call.

4. Written test related to learning results 1 to 6 on the date of the official call.

The activities in item 3 and the test in item 4 have a weight of 35%. Both require a minimum score of 5 out of 10.

6. Sustainable Development Goals

4 - Quality Education
7 - Affordable and Clean Energy
12 - Responsible Production and Consumption