Universidad Zaragoza

Academic Year/course: 2023/24

68753 - Statistical techniques, experimental design and modelling

Syllabus Information

Academic year: 2023/24
Subject: 68753 - Statistical techniques, experimental design and modelling
Faculty / School: 105 - Facultad de Veterinaria
Degree: 631 - Master's Degree in Food Quality, Safety and Technology
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The general objective of this compulsory core course is to provide students with a mathematical and statistical methodology that shows them how to plan the sequence of tests, trials, or experiments in such a way as to minimize their cost and the influence of experimental error on the information sought, and also to reach the most solid conclusions possible from a limited number of data. The approaches and objectives are aligned with the Sustainable Development Goals of the United Nations 2030 Agenda.

2. Learning results

The student, in order to pass the course, must demonstrate the following results:

1. Statistically describe a set of experimental data.

2. Design and carry out an adequate sampling according to the objective of the study. Design experiments based on statistical tools.

3. Analyze the results obtained from an experiment and draw conclusions about the population from the experimental sample.

4. Improve the understanding and interpretation of the results obtained through the model that describes their behavior.

5. To use different specific computer tools for data analysis, experiment design, and modeling.

3. Syllabus

Statistical Techniques
Topic 1: Types of variables and measurement scales.
Topic 2: Probability distributions.
Topic 3: Conditional probability.
Topic 4: Frequencies.
Topic 5: Descriptive statistics.
Topic 6: Sampling.
Topic 7: Statistical inference I: confidence intervals.
Topic 8: Statistical inference II: hypothesis testing.
Topic 9: Correlation and linear regression.

Experimental Design and Modeling
Topic 10: Experimental design.
Topic 11. Analysis of experimental data.
Topic 12. Modeling.
Topic 13. Management of computer programs for the statistical design of experiments.
Topic 14. Data analysis.
Topic 15. Management of computer programs for data modeling.

4. Academic activities

Face-to-face theory and theoretical-practical classes. Both in the statistical techniques module and in the design of experiments and modeling, all classes are computer-based.

Group work. 3-4 students will work in groups on the topics covered in modules I and II.

Oral presentation. Oral presentation of the work done in a group in which both the presentation and the defense of the work

will be valued.

5. Assessment system

Continuous evaluation:
Module I. Statistical techniques.
The fundamental learning results incorporate a theoretical-practical evaluation test (20% of the final grade).

Module II. Design of experiments and modeling.
Theoretical-practical evaluation test consisting of 10 multiple-choice questions and the completion of an exercise on experimental design, data analysis, or modeling (20% of the final grade).

Common to both modules: oral presentation of the proposed work described above (60% of the final grade).

Global test:
Students who have not chosen the continuous evaluation may be evaluated by means of a global test consisting of the same evaluation activities as for the continuous evaluation. The grading percentages for each activity and the evaluation criteria will be the same for the overall test as for the continuous evaluation.