

26813 - Statistical Methods for Optics and Optometry

Syllabus Information

Academic year: 2023/24

Subject: 26813 - Statistical Methods for Optics and Optometry

Faculty / School: 100 - Facultad de Ciencias

Degree: 297 - Degree in Optics and Optometry

ECTS: 6.0

Year: 2

Semester: Second semester

Subject type: Basic Education

Module:

1. General information

The subject is an instrumental subject in a degree that lies between two fields, experimental sciences and health sciences. Both are scientific areas where quantitative and qualitative information is handled. In this environment, statistics is a methodological tool of great interest, necessary for some of the professional activities of graduates.

The contents of the subject are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement: Goal 3: Health and wellness; Goal 4: Quality education; Goal 5: Gender Equality.

2. Learning results

Is able to summarize and describe the available information, through graphs, tables and statistics, working with one or two statistical variables.

Is able to apply the calculation of probabilities and random variables in simple real situations.

Is able to apply basic statistical inference techniques and interpret the results of the statistical analysis according to the proposed objectives.

Is able to use a statistical package as a tool both to describe data sets and to apply basic inference techniques.

Understands and knows how to explain the conclusions of a scientific article or technical report in the field of Optometry where a statistical analysis of a similar type to those seen in the subject is performed.

3. Syllabus

1. Introduction to Statistics and fundamental concepts.

2. Exploratory data analysis: Frequency tables and univariate graphical representations. Measures of a frequency distribution. Double entry tables. Graphical representations of two variables. Correlation coefficient. Simple linear regression.

3. Basic concepts of Probability. Conditional probability and Bayes' theorem. Concept of random variable and most common models. Central limit theorem.

4. Statistical inference: Point estimation, interval estimation and hypothesis tests (parametric and non-parametric).

Software: R with Rcommander, http://knuth.uca.es/R/doku.php?id=instalacion_de_r_y_rcmdr:uca.

4. Academic activities

- Participative lectures in large groups where the basic knowledge of statistics is acquired.
- Practical sessions with computers in small groups for case-based learning.
- Proposal of problems and questionnaires for individual work.
- Tutorials (small groups or individualized)
- Use of virtual learning platforms: Moodle

5. Assessment system

The student will be evaluated globally on the dates of the official calls that will be published in Moodle and on the notice boards of the degree. The examination will consist of two tests:

- The first with theoretical-practical questions with a grade of 2.5 points. This test will be without notes.
- The second will consist of problem solving with the help of the statistical program R commander. This test will be graded out of 7.5 points and notes are allowed for its completion (theory, practice scripts and personal notes).

In addition, throughout the four-month period, different activities will be proposed, including exercises and self-evaluation questionnaires in which the student may participate voluntarily and with which they may obtain a maximum of 1 point in total.

In order to obtain the final grade of the subject, the grade of these voluntary tests will be added to that of the global test as long as the grade of the latter is 4 points or more.

This evaluation method will be valid for the June and July calls.