

61343 - Multivariate Analysis Techniques

Syllabus Information

Academic year: 2024/25

Subject: 61343 - Multivariate Analysis Techniques

Faculty / School: 109 - Facultad de Economía y Empresa

Degree: 525 - Master's in Economics

ECTS: 3.0

Year: 1

Semester: Second semester

Subject type: Optional

Module:

1. General information

The approach of the subject is markedly instrumental since its objective is to provide the student with a set of statistical tools widely used in the performance of a multidimensional exploratory analysis. All topics will be approached from a practical point of view, using different data sets to illustrate the techniques explained. For this purpose, the R programming language and environment will be used, which integrates a multitude of packages that increase its capacity and versatility.

These approaches and objectives are directly aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>) since the examples worked on in class analyse databases that address these issues. In addition, all the training provided by this subject (theoretical and practical) contributes transversally to AGENDA 2030 and SDGs since it enables the student to contribute to the analysis and management of the 245 indicators of the SDGs. The acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement.

2. Learning results

- To perform an initial analysis of a multivariate data set.
- To perform a principal component analysis and interpret the results obtained.
- To perform a factor analysis and interpret the results obtained.
- To carry out a data classification process using agglomerative hierarchical procedures
- To carry out a data classification process using partitioning procedures.
- To design classification procedures in order to discriminate between groups of observations.
- To validate and interpret the results obtained in a classification procedure.

3. Syllabus

Topic 0: Introduction to R

Topic 1: Initial data analysis

Topic 2: Principal component analysis

Topic 3: Factor analysis

Topic 4: Cluster analysis

Topic 5: Discriminant analysis

4. Academic activities

Lectures: 15 hours

Practical classes: 15 hours

Personal study: 45 hours

Lectures will be used to develop the concepts and techniques of each topic, utilizing expository techniques or combined with some flipped classroom sessions, aiming to enhance participation and discussion in class with students. Practical classes will be used to show students how to approach and solve problems using the software tool (R program).

5. Assessment system

The assessment will be continuous. For this purpose, the following will be carried out:

- 6 deliveries or diverse activities for each of the topics (20% of the final grade as long as its average is higher than 3).
- 1 report including the solving of exercises related to an exploratory one-dimensional and two-dimensional analysis applied to a database (35% of the final grade provided that the grade of the report is higher than 3.)
- 1 report including the solving of exercises of application of the multivariate techniques

studied in the subject (45% of the final grade provided that the grade of the report is higher than 3).

If the student has not passed any of these activities during the term, they will have the opportunity to pass it by means of a global test in the two official calls for exams.

6. Sustainable Development Goals

7 - Affordable and Clean Energy

12 - Responsible Production and Consumption

13 - Climate Action