

## 27545 - Statistical Analysis for Finance

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 27545 - Statistical Analysis for Finance

**Faculty / School:** 109 - Facultad de Economía y Empresa

**Degree:** 449 - Degree in Finance and Accounting

**ECTS:** 6.0

**Year:** 4

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

The main goal of this subject is to provide students with knowledge of some of the most commonly used statistical tools for the exploratory analysis of multidimensional data and a time series analysis of financial series. 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 goals are aligned with the Sustainable Development Goals (SDGs) of the Agenda 2030 of United Nations (<https://www.un.org/sustainabledevelopment/es/>), specifically, the activities planned in the subject will contribute to the achievement of goals 7 (Affordable and clean energy), 11 (Sustainable cities and communities), 12 (Responsible production and consumption) and 13 (Climate action) [as the examples worked on in class analyze the basics of the databases that address these issues](#). While it is true that all the training provided by this subject (theoretical and practical) contributes transversally to AGENDA 2030 and SDGs since its training enables the student to contribute to the analysis and management of the 245 indicators of the SDGs.

### 2. Learning results

**The student, in order to pass this subject, must demonstrate the following results:**

1. Perform an initial analysis of a multivariate data set
2. Perform principal component analysis and interpret the results obtained
3. Perform a factor analysis and interpret the results obtained
4. Carry out a data classification process using agglomerative hierarchical procedures
5. Carry out a data classification process using partitioning procedures
6. Design classification procedures to discriminate between groups of observations
7. Develop univariate models of the volatility of a financial asset
8. Define and calculate various measures of financial risk

### 3. Syllabus

#### **Block 1. Introduction to R through basic statistical data analysis**

Unit 1: Introduction to R

Unit 2: Initial exploratory data analysis

#### **Block 2: Multivariate statistical techniques**

Unit 3: Dimension reduction. Main Components. Factor Analysis

Unit 4: Classification techniques. Cluster analysis. Discriminant Analysis

#### **Block 3. Time series analysis of financial series**

Unit 5: Statistical modeling of volatility. Risk assessment and management

### 4. Academic activities

Master classes: 30 hours

Practical classes: 30 hours

Personal Study: 85 hours

Assessment tests: 5 hours

6 ECTS = 150 hours

In principle, the teaching methodology and its evaluation is planned to be based on face-to-face classes . However, if circumstances so require, they may be carried out online.

## 5. Assessment system

The subject will be evaluated by means of **continuous or global assessment** during the first call and by means of global evaluation during the second call.

### **Continuous assessment:**

- 5 or 6 test type deliveries (C) corresponding to each of the topics.
- 1 delivery in report format (I1) related to the one-dimensional and two-dimensional exploratory analysis.
- 1 delivery in report format (I2) related to the multivariate techniques studied.

### **Global assessment:**

It consists of an exam (E) that will assess the theoretical and practical knowledge of the subject through exercises in which will have to answer different questions about different databases. The answers to the questions will be made by means of scripts using the R program, and writing a report with the conclusions obtained.

### **Assessment Criteria:**

In the case of continuous assessment, the 5 or 6 questionnaires (C) and the reports (I1, I2) will be scored on a scale from 0 to 10. The student must have at least a 3 in each of the three types of activities (the average of the 5-6 questionnaires, the report I1 and the report I2) to be able to make the average, otherwise, the student cannot continue by this system of continuous evaluation. If at least 3 has been obtained in the marks of each activity, the final mark in the continuous assessment will be calculated as the weighted average of 30% of the average assessment of the questionnaires, 30% of the average assessment of the questionnaires, 30% of the I1 report and 40% of the I2 report. The final grade must be equal to or higher than 5.

Students who have not taken the continuous evaluation or whose grade has not exceeded 5 or who wish to improve their grade may opt for a global evaluation.

In the case of the global evaluation there will be only one exam (E) that will be scored on a scale of 0 to 10 and its final grade must be equal or greater than 5.

In other words, the final grade for the course will be calculated as follows:

**Final grade = 0.3\*Average (Grade(C)) + 0.3\*Grade(I1) + 0.4\*Grade(I2)**

if the student uses continuous assessment to pass the subject

**Final grade = Grade (E)**

if the student uses the global evaluation to pass the subject