

Academic Year: ( 2023 / 2024 )

Review date: 15-07-2023

Department assigned to the subject: Statistics Department

Coordinating teacher: UCAR MARQUES, IÑAKI

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Introduction to Programming with R (19151)

## OBJECTIVES

- Knowledge of the general principles of analytical design, graphical elements and their visual perception.
- Ability to select the type of representation and graphic elements most appropriate to the type of data and the result to be communicated.
- Ability to read, understand, analyze and elaborate graphic representations with social data.
- Ability to produce automated reports and dashboards with reproducible visualizations.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Fundamentals of graphical practice
  - 1.1. Why graphics
  - 1.2. Graphical integrity
  - 1.3. Graphical perception
  - 1.4. Principles of graphical representation
2. The grammar of graphs in R
  - 2.1. Building graphs layer by layer
  - 2.2. Guides and scales
  - 2.3. Coordinate systems
  - 2.4. Facets
  - 2.5. Themes
3. Data visualization in R
  - 3.1. Distribution
  - 3.2. Correlation
  - 3.3. Ranking
  - 3.4. Part of a whole
  - 3.5. Evolution
  - 3.6. Maps
  - 3.7. Flow
  - 3.8. Other techniques
4. Data communication in R
  - 4.1. R Markdown
  - 4.2. Documents and notebooks
  - 4.3. Presentations
  - 4.4. Other formats
  - 4.5. Dashboards

## LEARNING ACTIVITIES AND METHODOLOGY

Training Activities:

- Theoretical-practical classes
- Tutorials
- Group work
- Individual student work

## Teaching Methods:

- Presentations in the professor's lecture room with computer and audiovisual support, in which the main concepts of the subject are developed and a bibliography is provided to complement the students' learning.
- Critical reading of texts recommended by the subject professor: Press articles, reports, manuals and/or academic articles, either for later discussion in class, or to expand and consolidate knowledge of the subject.
- Resolution of practical cases, problems, etc. raised by the professor, either individually or in a group.
- Presentation and discussion in class, under the moderation of the professor, of topics related to the content of the subject, as well as practical case studies.
- Developing pieces of work and reports, individually or in group.

## ASSESSMENT SYSTEM

- Participation in the class (25%)
- Individual or group work done during the course (75%)

In the extraordinary call, the evaluation system will be as follows:

1) Exam: 100%

<b>% end-of-term-examination:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

## BASIC BIBLIOGRAPHY

- Munzner, T. Visualization analysis and design, CRC Press, 2014
- Tufte, E. R. The visual display of quantitative information, Graphics Press, 2018
- Wickham, H., & Sievert, C. ggplot2: Elegant graphics for data analysis, Springer, 2016

## ADDITIONAL BIBLIOGRAPHY

- Cleveland, W. S. The elements of graphing data, Wadsworth Inc, 1985
- Meirelles, I. Design for information, Rockport Publishers, 2013
- Rahlf, T. Data Visualisation with R: 111 examples, Springer, 2019
- Tufte, E. R. Envisioning information, Graphics Press, 2018
- Tufte, E. R. Visual explanations: Images and quantities, evidence and narrative, Graphics Press, 2019
- Tufte, E. R. Beautiful evidence, Graphics Press, 2019
- Ware, C. Information visualization: Perception for design, Elsevier, 2021
- Wilkinson, L. The grammar of graphics, Springer New York, 2005