

Academic Year: (2022 / 2023)

Review date: 18/05/2022 20:29:45

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

Core Competences:

- Having and understanding the knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- Students know how to apply their acquired knowledge and problem-solving skills in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.
- Students are able to integrate knowledge and to face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
- Students know how to communicate their conclusions and the knowledge and ultimate reasons behind them to specialised and non-specialised audiences in a clear and unambiguous way.
- Students have the learning skills that will enable them to continue studying in a way that will be largely self-directed or autonomous.

General Competences:

- Ability to understand and analyze the main global social theories and how they are changing with the application of computational tools.
- Ability to identify, define and formulate social science problems and solve them using computational techniques. This includes the ability to assess all the factors involved, not only technical but also legal.
- Ability to compile and analyze existing knowledge in the different areas of computational social sciences, and to propose possible solutions to the problems raised.
- Ability to apply theoretical and methodological knowledge of computational social sciences to the analysis and resolution of specific cases and empirical problems.
- Ability to address issues raised under new or unfamiliar environments, within the context of computational social sciences.

Specific Competences:

- Ability to understand and use visualization and graphical representation techniques for computational social analysis at an advanced level.

Learning Outcomes:

- 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

% end-of-term-examination/test:	0
% of continuous assessment (assignments, laboratory, practicals...):	100
<ul style="list-style-type: none"> - Participation in the class (25%) - Individual or group work done during the course (75%) 	

BASIC BIBLIOGRAPHY

- Tufte, E. R. The visual display of quantitative information, Graphics Press, 2018
- Wilkinson, L. The grammar of graphics, Springer New York, 2005

ADDITIONAL BIBLIOGRAPHY

- 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
- Wickham, H., & Sievert, C. ggplot2: Elegant graphics for data analysis, Springer, 2016