Programming in R

Academic Year: (2021 / 2022) **Review date: 03-06-2021**

Department assigned to the subject: Statistics Department

Coordinating teacher: DELGADO GOMEZ, DAVID

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

OBJECTIVES

The student will acquire the following knowledge:
1. Proficiency in the R programming language and the R-studio working environment.
2. Mastering the different types of data structures.
3. Exploratory data analysis techniques and presentation of results through data visualization techniques.
4. Familiarity with the main data analysis packages of R.
5. Be able to perform a simulation properly.
6. Accelerate the programs implemented by means of parallel programming.
7. Find errors and bottlenecks in their code and generate reports.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Basics of Programming I.

   The R-studio environment. Types of data (Arrays, Lists, Factors, Data Frames,...) and their operations. Control structures. Functions.

2. Basics of Programming II.

   Advanced data structures. Reading and storage of data.

3. Data visualization.

   The ggplot2 package.

4. Introduction to some useful packages in R.

   MASS, Caret, dplyr and data.table packages.

5. Simulations.

6. Parallel programming.

7. Debugging, Profiling and presentation of results with Rmarkdown.

LEARNING ACTIVITIES AND METHODOLOGY

The course will be taught in 7 practical classes in a computer room.
The students will have collective tutoring sessions where they will be able to resolve their doubts regarding both the material explained in the classes and the practical assignments that will be evaluated.

ASSESSMENT SYSTEM

The subject will be evaluated through the delivery of several practices which will be updated throughout the weeks of the course.

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

BASIC BIBLIOGRAPHY

- Fox, J. Using the R Commander: A Point-and-click Interface for R, CRC Press., 2016

- Irizarry, R.A. Introduction to data science: data analysis and prediction algorithms with R, Boca Raton, Florida. CRC Press, 2020

- Wickham, H., & Grolemund, G. (2016) R for data science: import, tidy, transform, visualize, and model data, O'Reilly Media, Inc., 2016

BASIC ELECTRONIC RESOURCES

- . R for Data Science: https://r4ds.had.co.nz/index.html

- . R Programming for Data Science: https://bookdown.org/rdpeng/rprogdatascience

- . Introduction to Data Science Data Analysis and Prediction Algorithms with R: https://rafalab.github.io/dsbook/