

Subject

Programming and Databases I

Year: 1

Credits: 9 ECTS

Language: Spanish

Competencies

Core competences:

CB1. Students have demonstrated knowledge and understanding in an area of study that builds on the foundation of general secondary education and is usually at a level that, while relying on advanced textbooks, also includes certain elements involving cutting-edge knowledge in their field of study

CB2. Students are able to apply their knowledge to their work or vocation in a professional manner and possess the skills that are typically demonstrated through the development and defence of arguments and problem solving within their field of study.

General competences:

CG1. Analytical thinking and ability to respond to complex challenges.

Specific competences:

CE2. Have the programming skills required to address the entire data life-cycle.

Learning outcomes

RA1. Be able to analyse, logically and from different perspectives and disciplines, the complex challenges they face. To this end, identify which are the key and important aspects of the problem, analyse them and, after a critical and reasoned consideration, propose, in a reasoned manner, different creative and transformative alternatives/solutions.

RA9. Have the programming skills required to address the entire data life-cycle

RA19. Be capable of working in a network, collaborating in a virtual way with the community

Syllabus

Introduction to R

- Introduction to programming
- Data types. Variables and constants
- Operators and expressions
- Basic functions in R
- Simple arithmetic functions
- Data generation: regular and random sequences
- Creating objects and operations: vectors, arrays, dataframes, lists
- Import/export of files: csv, xlsx
- Creating a data project in R
- Generating Reports with RMarkdown

Intermediate programming in R

- Basic manipulation of dataframes
- Date/time, string and factor formats
- Control structures
- Loops: while, for
- Functions
- Apply family

Advanced programming in R

- Advanced manipulation of dataframes. Libraries: dplyr and tidyr
- Lists
- Regular expressions

Databases

- Introduction to databases
- Designing a database.
- Definition of a relational model
- Database creation and use of MySQL software (DDL)
- Data definition and manipulation language (SQL,DML)

Ubuntu operating system

- Basic instructions
- Connecting to R instances on a server
- Connecting to MySQL DB instance from R

APIs

- Designing an API with plumber
- API: Deployment of machine learning models

Training activities

The training activities planned for this module are the following:

- Challenge-based learning (3 ECTS)
- Teamwork (0.5 ECTS)
- Workshops (1.5 ECTS)
- Online resources (0.5 ECTS)
- Reflection (0.5 ECTS)
- Individual work (1 ECTS)
- Learning communities (2 ECTS)

Assessment system

Assessment will be by means of the continuous assessment system, providing constant feedback to both teachers and students on the learning process throughout the academic period:

- Learning activities involving the presentation of knowledge and individual study may be assessed by means of oral and/or written tests, which will account for a maximum of 60% of the final mark.
- The training activities aimed at acquiring the practical skills of the subjects will be assessed through the completion of various activities (assignments, case studies, challenges, etc.) accounting for at least 40% of the final mark.

Details of the assessment and marking will be made explicit in the annual academic planning of the subjects, in accordance with the teachers responsible and the determining factors of each course.

Bibliography

- Marqués Asensio, F (2017). R en profundidad. Madrid. RC LIBROS