

Subject

Programming and Databases II

Year: 2

Credits: 4 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 Python

- Installation and configuration
- Anaconda and Visual Studio Code
- Jupyter Notebooks and Colab
- Virtual environments
- Packages

Data structures and operators

- Basic data types: numbers, text strings, tuples, lists, sets and dictionaries
- Dates and times
- Operators

Control sentences and functions

- Flow control statements
- Functions

Files

- File types (txt, csv, json, etc.)
- Opening and writing files
- Pickling and unpickling

Pandas

- Numpy
- Data structures in Pandas (Series and DataFrames)
- Data upload, storage and file formats
- DataFrames functionalities (reindexing, dropping, filtering, etc.)
- Data cleaning and preparation
- Data mapping (join, combine, reshape)
- Aggregation and grouping of data

Creating data projects with Python

- Client/server architectures
- Designing an API with Flask
- Supervised and unsupervised model service
- Efficient programming

Databases

- SQLite
- MySQL
- Non-relational databases: MongoDB

Training activities

The training activities planned for this module are the following:

- Challenge-based learning (2 ECTS)
- Teamwork (0.5 ECTS)
- Workshops (0.5 ECTS)
- Online resources (0.25 ECTS)
- Reflection (0.5 ECTS)
- Individual work (0.5 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

- McKinney, W (2012) Python for Data Analysis. United States. O'REILLY
- Fernández Montoro, A (2012). Python 3 al descubierto. Madrid. RC LIBROS