

Academic Year: (2023 / 2024)

Review date: 02-10-2023

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: ALER MUR, RICARDO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming with R

OBJECTIVES

The main course objectives are:

1. Integrate C++ with R using Rcpp: Learn to combine the power of C++ programming with the R programming language, enabling efficient and high-performance computation.
2. Master Python, numpy, and pandas: Gain proficiency in Python programming language along with essential data manipulation and analysis libraries like numpy and pandas.
3. Develop Data Visualization Skills: Acquire the ability to create visual representations of data using Python libraries such as matplotlib and seaborn.
4. Explore Machine Learning with scikit-learn: Understand the fundamentals of machine learning and apply it practically using the scikit-learn package in Python.

DESCRIPTION OF CONTENTS: PROGRAMME

- 1) Combination of C ++ with R through Rcpp.
- 2) Python Language, numpy and pandas libraries. Graphics in Python (matplotlib and seaborn).
- 3) Machine learning packages (scikit-learn).
- 4) Introduction to Stan

LEARNING ACTIVITIES AND METHODOLOGY

Theory: Lectures will be focused on teaching concepts and language elements.

Practical computer Sessions (sessions with student's own laptops): The practical classes will be developed so that, in a supervised way, students learn to solve practical cases. The practices will be carried out in groups of 2 students. There are several assignments related to topics in the course.

There will be tutorials to help the understanding both of theory and practice.

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TRAINING ACTIVITIES OF THE STUDY PLAN REFERRED TO MATTERS

- AF1 Theoretical class
- AF2 Practical classes
- AF4 Laboratory practices
- AF5 Tutorials
- AF6 Group work
- AF7 Individual student work
- AF8 Face-to-face evaluation tests

TEACHING TRAINING METHODOLOGIES OF THE PLAN REFERRED TO MATTERS

- MD1 Lectures with material and bibliography provided.
- MD3 Resolution of practical cases, problems, etc.

MD5 Preparation reports individually or in groups

ASSESSMENT SYSTEM

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SE2 Individual or group work carried out during the course

SE3 Final exam

% end-of-term-examination: 30

% of continuous assessment (assignments, laboratory, practicals...): 70

BASIC BIBLIOGRAPHY

- Aurélien Géron Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems 2nd Edición, O'Reilly Media, 2019
- Dirk Eddelbuettel Seamless R and C++ Integration with Rcpp (Use R!) , Springer, 2013
- Eric Matthes Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction to Programming, No Starch Press, 2019

ADDITIONAL BIBLIOGRAPHY

- Julian Avila scikit-learn Cookbook (2nd edition), Packt, 2017

BASIC ELECTRONIC RESOURCES

- Aurelien Géron . Github for Hands-on Machine Learning book: <https://github.com/ageron/handson-ml2>
- Eric Matthes . Resources for Python Crash Course: https://github.com/ehmatthes/pcc_2e
- Julian Avila . Scikit learn cookbook: <https://github.com/PacktPublishing/scikit-learn-Cookbook-Second-Edition>
- Python team . Official Python tutorial: <https://docs.python.org/3/tutorial/>