

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

% end-of-term-examination: 30

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

ASSESSMENT SYSTEM

SE2 Individual or group work carried out during the course

SE3 Final exam

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/>