Advanced Programming

Academic Year: (2020 / 2021) **Review date: 10/07/2020 19:27:42**

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

COMPETENCES THAT THE STUDENT ACQUIRES WITH THIS MATTER

CB9 That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialized audiences in a clear and unambiguous way
CB10 That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
CG4 Ability to synthesize the conclusions obtained from these analyzes and present them clearly and convincingly in a bilingual environment (Spanish and English) in writing.
CG6 Apply social skills for teamwork and to relate to others autonomously.
CE2 Use free software such as Python for the implementation of statistical analysis.
CE8 Apply and develop visualization techniques of collected samples with free distribution software such as Python.

LEARNING RESULTS THAT THE STUDENT ACQUIRES

- Integration of C ++ and R via Rcpp
- Python programming language. Machine learning packages.
- Brief introduction to the STAN programming language

DESCRIPTION OF CONTENTS: PROGRAMME

1) Combination of C ++ with R through Rcpp.
2) Python Language. Graphics in Python (matplotlib and seaborn). Machine learning packages (scikit-learn).
3) Brief introduction to STAN.

LEARNING ACTIVITIES AND METHODOLOGY

Theory: Lectures will be focused on teaching all concepts related to machine learning. They will be carried out live (in-class).

Practical computer Sessions (LIVE (in-class) 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/test:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

ASSESSMENT SYSTEM
SE2 Individual or group work carried out during the course
SE3 Final exam

BASIC BIBLIOGRAPHY

- Dirk Eddelbuettel Seamless R and C++ Integration with Rcpp (Use R!) , Springer, 2013

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