Advanced Regression and Prediction

Academic Year: (2021 / 2022) **Review date: 22-07-2021**

Department assigned to the subject: Statistics Department
Coordinating teacher: MOLINA PERALTA, ISABEL
Type: Electives ECTS Credits : 3.0
Year : 1 Semester : 2

OBJECTIVES

Become familiar with different analytical tools, based on data, to make business decisions

Capacity to develop skills to analyze and find relationships between many variables/features

Relax some of the assumptions in classical linear regression

Deal with the curse of dimensionality in high-dimensional problems

Acquire knowledge about the main tools in advanced predictive tools and handle the R language with those models

DESCRIPTION OF CONTENTS: PROGRAMME

Introduction

Feature Engineering: non-linearities and interactions

Efficient Estimation in Least-Squares (QR and SVD)

Robustness

Variable Selection

Regularization tools (shrinkage)

Dimension-reduction techniques

k-NN

Decision Trees and Random Forests

LEARNING ACTIVITIES AND METHODOLOGY

Lectures: the contents of the course will be introduced, explained and illustrated with examples. Teaching materials will be provided on Aula Global.

Computer Labs: Examples and cases studies with the R language.

ASSESSMENT SYSTEM

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

Individual or team works carried out along the course
Final exam

BASIC BIBLIOGRAPHY

- G. James, D. Witten, T. Hastie and R. Tibshirani An Introduction to Statistical Learning with Applications in R, Springer, 2013

- Kevin P. Murphy Machine Learning: A Probabilistic Perspective, The MIT Press, 2012

- Machine Learning with R Brett Lantz, Packt Publishing, 2015