Advanced Regression and Prediction

Academic Year: (2019 / 2020) **Review date: 08-04-2019**

Department assigned to the subject: Department of Statistics

Coordinating teacher: NOGALES MARTIN, FCO. JAVIER

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

COMPETENCES AND SKILLS THAT WILL BE ACQUIRED AND LEARNING RESULTS.

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 (50% of the sessions): the contents of the course will be introduced, explained and illustrated with examples. Teaching materials will be provided on Aula Global.

Computer Labs (50% of the sessions): Examples and cases studies with the R language.

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

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