

Academic Year: ( 2019 / 2020 )

Review date: 26-04-2020

Department assigned to the subject: Statistics Department

Coordinating teacher: NOGALES MARTIN, FRANCISCO JAVIER

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 (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.

<b>% end-of-term-examination:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100

**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

