

Academic Year: ( 2019 / 2020 )

Review date: 29-04-2020

Department assigned to the subject: Statistics Department

Coordinating teacher: GALEANO SAN MIGUEL, PEDRO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

Programming in R, Stochastic Processes and Multivariate Analysis.

**OBJECTIVES****COMPETENCES THAT THE STUDENT ACQUIRES WITH THIS SUBJECT**

-Basic competences:

CB7: That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

CB9: That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialized and non-specialised audiences in a clear and unambiguous way.

-General competences:

CG1: Know and apply the theoretical foundations of the techniques of analysis and representation of information, in order to adapt it to real problems.

CG2: Identify the most appropriate statistical model for each real problem and know how to apply it for the analysis, design and solution of it.

CG3: Obtain scientifically viable solutions for real statistical problems, both individually and as a team.

CG4: Synthesise the conclusions obtained from statistical analyses and present them clearly and convincingly in a bilingual environment (Spanish and English) both written and orally.

CG7: Know and apply the theoretical foundations of the techniques of analysis and representation of information, in order to adapt it to real problems.

- Specific competences:

CE2: Use free software such as R and Python for the implementation of statistical analysis.

CE9: Identify correctly the type of statistical analysis corresponding to certain objectives and data.

CE10: Apply statistical modeling in the treatment of relevant problems in the scientific field.

CE13: Apply models for supervised and unsupervised learning.

CE14: Modelling complex data with stochastic dependence.

KNOWLEDGE ACQUISITION: 1) basis representation of functional data; 2) dimension reduction techniques for functional data 3) linear regression model with functional predictor; 4) classification with functional data.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction to functional data analysis
2. Functional principal component analysis
3. Functional linear regression
4. Classification with functional data

**LEARNING ACTIVITIES AND METHODOLOGY****LEARNING ACTIVITIES RELATED TO MATTERS**

- |     |                   |
|-----|-------------------|
| AF1 | Theoretical class |
| AF2 | Practical class   |
| AF4 | Laboratory        |
| AF5 | Tutoring          |
| AF6 | Group work        |

AF7 Individual work  
 AF8 In-person evaluation tests

Code activity	Total hours	In-person hours	% In-person hours - student
AF1	44	44	100
AF2	20	20	100
AF4	20	20	100
AF5	16	16	100
AF6	40	0	0
AF7	154	0	0
AF8	6	6	100
TOTAL MATTER	300	100	33

#### TEACHING METHODOLOGIES RELATED TO MATTERS

MD1 Explanations in the theoretical class with support of computer and audiovisual media, in which the main concepts of the subject are developed and the bibliography is provided to complement the students learning.  
 MD3 Resolution of case study, problems, etc. raised by the professor individually or in groups  
 MD5 Development of projects and reports individually or in groups

#### ASSESSMENT SYSTEM

100% Individual or group work carried out during the course

**% end-of-term-examination:** 0  
**% of continuous assessment (assignments, laboratory, practicals...):** 100

#### BASIC BIBLIOGRAPHY

- J.O. Ramsay and B.W. Silverman Functional Data Analysis, Springer-Verlag, 1997, 2005
- J.O. Ramsay and B.W. Silverman Applied Functional Data Analysis, Springer-Verlag, 2002
- J.O. Ramsay, G. Hooker and S. Graves. Functional Data Analysis with R and MATLAB, Springer, 2010
- P. Kokoszka and M. Reimherr Introduction to Functional Data Analysis, Chapman and Hall/CRC, 2017