

Academic Year: ( 2024 / 2025 )

Review date: 02-04-2024

Department assigned to the subject: Statistics Department

Coordinating teacher: NOGALES MARTIN, FRANCISCO JAVIER

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

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

Mathematics for data analysis  
 Statistics for data analysis

**OBJECTIVES****\* Basic competences**

- CB6: Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- CB9: That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialised and non-specialised audiences in a clear and unambiguous way.
- CB10: That the students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.

**\* General competences**

- CG1: Ability to apply the techniques of analysis and representation of information, in order to adapt it to real problems.
- CG4: Synthesise the conclusions obtained from data analyses and present them clearly and convincingly in a bilingual environment (Spanish and English) both written and orally.
- CG5: Be able to generate new ideas (creativity) and anticipate new situations, in the contexts of data analysis and decision making.
- CG6: Use social skills for teamwork and to relate to others autonomously.
- CG7: Apply advanced techniques of analysis and representation of information, in order to adapt it to real problems.

**\* Specific competences**

- CE1: Apply in the development of methods of analysis of real problems, advanced knowledge of statistical inference.
- CE2: Use free software such as R and Python for the implementation of statistical analysis.
- CE5: Apply the advanced statistical foundations for the development and analysis of real problems, which involve the prediction of a variable response.
- CE6: Apply nonparametric models for the interpretation and prediction of random phenomena.
- CE10: Apply statistical modeling in the treatment of relevant problems in the scientific field.

**\* Learning outcomes**

Acquisition of knowledge on: 1) statistical-mathematical foundations of the linear regression model; 2) comparison and selection of regression models; 3) extensions of the linear regression model (penalization, nonlinear models, models with dimensionality reduction, generalized linear models, etc.); 4) big data adaptations for generalized linear models.

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction
2. Linear Regression
3. Generalized Linear Models
4. Advanced Regression

#### LEARNING ACTIVITIES AND METHODOLOGY

50% lectures with teaching materials available on the Web. The other 50% practical sessions (computer labs).

#### ASSESSMENT SYSTEM

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

The assessment will be made by continuous evaluation, weighting with a 50% the first assignment and with the other 50% the second one.

With a minimum grade of 5 points over 10 in each assignment.

#### BASIC BIBLIOGRAPHY

- James, G., Witten, D., Hastie, T. y Tibshirani, R. An Introduction to Statistical Learning with Applications in R, Springer-Verlag, 2021

#### ADDITIONAL BIBLIOGRAPHY

- Kuhn, M. and Johnson, K. Applied Predictive Modeling, Springer, 2013
- Li, Q. and Racine, J. S. Nonparametric Econometrics, Princeton University Press, 2007
- Peña, D. Regresión y Diseño de Experimentos, Alianza Editorial, 2002
- Wasserman, L. All of Statistics, Springer-Verlag, 2004
- Wood, S. N. Generalized Additive Models: An Introduction with R, Chapman & Hall/CRC, 2006