

Academic Year: (2021 / 2022)

Review date: 04-06-2021

Department assigned to the subject: Statistics Department

Coordinating teacher: DURBAN REGUERA, MARIA LUZ

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Statistical inference I
Statistical inference II
Regression methods

OBJECTIVES

- Being able to identify and propose the correct model for a specific problem
- Ability to manage computationally and analytically the models proposed and carry out the analysis of the results obtained.
- Ability to model and analyze static and dynamic data
- Ability to validate models and interpret the results
- Ability to draw conclusions and write reports
- Ability to work in multidisciplinary groups

DESCRIPTION OF CONTENTS: PROGRAMME

1. Revision of linear models
 - 1.2 Estimation
 - 1.3 Inference
2. Introduction to generalized linear models
 - 2.1 Exponential family
 - 2.2 Components of a GLM
 - 2.3 Estimation: Fisher Scoring Algorithm
 - 2.4 Inference
 - 2.5 Diagnostics
3. Models for binary data and proportions
 - 3.1 Logistic regression
 - 3.2 Parameter interpretation: Odds ratio
 - 3.3 Validation: ROC curve
4. Models for count data
 - 4.1 Poisson regression
 - 4.2 Log-linear models
5. Generalized additive models
 - 5.1 Smoothing techniques
 - 5.2 Estimation and inference
6. Random effects models
 - 6.1 Estimation
 - 6.2 Inference
 - 6.3 Models for repeated measures and longitudinal data

Ordinary examination:

This course will have continuous evaluation consisting of exams and computer labs

The final mark will be a weighted average:

- 60% final exam
- 40% continuous evaluation

The students with a mark of 6 or more in each of the continue evaluation activities will not have to take the final exam. In this case, their final mark will be 100% of the mark obtained in the continuous evaluation.

In the extraordinary examination the evaluation system will be the maximum between:

- 100% of the exam
- The same system as the ordinary examination

% end-of-term-examination:	60
% of continuous assessment (assignments, laboratory, practicals...):	40

BASIC BIBLIOGRAPHY

- Dobson, A. An introduction to generalized linear models, Chapman and Hall, 2001
- Faraway, J. Extending the Linear Model with R: Generalized Linear, Mixed Effects and Nonparametric Regression Models, Chapman & Hall/CRC Texts in Statistical Science, 2016
- McCulloch, C. Generalized, Linear, and Mixed Models, Wiley Series in Probability and Statistics, 2001

BASIC ELECTRONIC RESOURCES

- Durban, M. . Modelos Multinivel:
<http://halweb.uc3m.es/esp/Personal/personas/durban/esp/web/Multinivel/Multinivel.html>
- Durban, M. . Modelos Aditivos Generalizados: <http://www.est.uc3m.es/durban/esp/web/cursos/GAMs/GAMs.html>