

Academic Year: (2024 / 2025)

Review date: 14-03-2025

Department assigned to the subject: Statistics Department

Coordinating teacher: GALEANO SAN MIGUEL, PEDRO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Statistical Inference Techniques I
 Statistical Inference Techniques II
 Regression Methods

LEARNING OUTCOMES**LEARNING OUTCOMES**

- 1.To have acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and methodology of work in their field of study to a depth that reaches the cutting edge of knowledge.
- 2.To be able, by means of arguments or procedures developed and supported by themselves, to apply their knowledge, understanding and problem-solving skills in complex or professional and specialised fields of work that require the use of creative and innovative ideas.

BASIC COMPETENCES

- 1.Students have demonstrated possession and understanding of knowledge in an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study
- 2.Students are able to apply their knowledge to their work or vocation in a professional manner and possess the competences usually demonstrated through the development and defence of arguments and problem solving within their field of study.
- 3.Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements which include reflection on relevant social, scientific or ethical issues.

GENERAL COMPETENCES

- 2.Efficiently manage a company's databases for statistical use. Adequately design the data acquisition process and its subsequent processing.
- 3.Describe a set of data from numerical measures and graphs, both at univariate and multivariate level, highlighting the possible relationships between the variables of interest.
- 4.Identify or create the appropriate model for the specific problem that arises in each business activity (finance, marketing, production planning and control, etc.). Computationally and analytically manipulate the models established, taking advantage of the power of statistical and optimisation methods, etc., and analyse the results obtained.
- 5.Communicate the results, the conclusions of the models and the proposed solutions in a way that is intelligible to the rest of the company, so that they are accepted and implemented by decision-makers.

SPECIFIC COMPETENCES

- 1.Describe, synthesise and graphically represent a set of data.
- 2.Modelling and analysing both static and dynamic data using statistical techniques.
- 5.Design and manage relational and non-relational databases.
- 8.Understand the concepts necessary for the development of market research and learn the main instruments to analyse the results of market research. Synthesise the objectives of the marketing function and its different measures as well as evaluate the fulfilment of the main objectives of the marketing function.
- 9.Developing, constructing and validating statistical models that reproduce the fundamental characteristics of the problems under analysis.
- 10.Interpret the results of a quantitative analysis and draw practical conclusions on the real problem

for which the statistical models have been built. Write reports and communicate conclusions with the help of advanced graphical representation techniques.

16. Plan integrated offline and online strategies, through the use of communication in social networks, display advertising, affiliation marketing, email, remarketing, gamification, big data.

TRANSVERSAL COMPETENCES

1. Knowing

and being able to handle interpersonal skills on initiative and responsibility, negotiation, emotional intelligence, etc. as well as calculation tools that allow the consolidation of the basic technical skills required in any professional field.

2. Being able to establish good interpersonal communication and to work in multidisciplinary and international teams.

3. Being able to organise and plan their work, making the right decisions based on the information available, gathering and interpreting relevant data to make judgements and critical thinking within their area of study.

OBJECTIVES

1. Understanding the basic techniques for analyzing categorical data.
2. Knowing and managing statistical programs for the analysis of categorical data.
3. Using the methodology for the analysis of real data.

1. Capacity for analysis and synthesis.
2. Modeling and resolution of problems.
3. Oral and written communication.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction: Distributions and inference for categorical data.
2. Contingency tables: Description and inference.
3. Introduction to generalized linear models.
4. Logistic regression models and alternatives.
5. Models for multinomial responses.
6. Log-linear models and alternatives.
7. Models for paired samples.

LEARNING ACTIVITIES AND METHODOLOGY

Theory (4 ECTS). Theoretical classes with support material available on the Web.

Practice (2 ECTS) Problem-solving classes and labs.

ASSESSMENT SYSTEM

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

Final exam: 50%.

Partial exam: 30%.

Solving exercises and practices: 20%.

BASIC BIBLIOGRAPHY

- Agresti, A Categorical Data Analysis, New York: John Wiley & Sons, 2013 (third Edition)

- Agresti, A. An introduction to Categorical data analysis, John Wiley & Sons., 2007
- Andersen, E.B Introduction to the Statistical Analysis of Categorical Data, Springer, 1997
- Collett D. Analysis of Binary Data, Chapman & Hall., 2003
- Cox D.R. & Snell E.J. Analysis of Binary Data, Chapman & Hall, 1989
- Cox D.R. & Snell E.J. Analysis of Binary Data, Chapman & Hall, 2018
- Kateri, M Contingency Table: Analysis Methods and Implementation Using R, Birkhäuser, 2014
- Zelterman, D Models for Discrete Data, Oxford University Press, 2006 (revised edition)

ADDITIONAL BIBLIOGRAPHY

- Bishop, Y. M., Fienberg, S. E., Holland, Paul W. Discrete Multivariate Analysis: Theory and Practice, Springer (Originally published by MIT Press, 1975), 2007
- Hosmer, D.W. and Lemeshow, S. Applied Logistic regression, Willey, 2000
- McCullagh, P. and Nelder, J.A. Generalized Linear Models, Second Edition, London: Chapman & Hall, 1989
- Stokes, M.E., Davis, C.S. and Koch, G.G. Categorical Data Analysis Using The SAS System, Second Edition, NC: SAS Institute Inc., 2000

BASIC ELECTRONIC RESOURCES

- Alan Agresti . Website for CATEGORICAL DATA ANALYSIS, 3rd edition: <http://www.stat.ufl.edu/~aa/cda/cda.html>