Statistics

Academic Year: (2022 / 2023) **Review date: 03-01-2023**

Department assigned to the subject: Statistics Department

Coordinating teacher: WIPER , MICHAEL PETER

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Social Sciences and Law

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

No prerequisites

OBJECTIVES

1. Understand the basic concepts of population, sample, variable and statistic.
2. Know how to summarize a sample using measures of centre and variability.
3. Learn how to use statistical graphs to illustrate the main features of a sample.
4. Understand and implement the basic ideas of a regression analysis.
5. Learn how to estimate a population parameter based on sample data and how to formalize a hypothesis test.
6. Use of statistical software.

1. Capacity of analysis and synthesis.
2. Understanding of how to use computer packages.
3. Problem solving.
4. Teamwork.
5. Critical reasoning.
6. Verbal and written communication.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction.
1.1. Concept and uses of statistics.
1.2. Statistical terminology.
1.3. Typos of variables.

2. Analysis of univariate data.
2.1. Representations and plots of qualitative data.
2.2. Representations and plots of quantitative data.
2.3. Numerical summary of a sample of data.

3. Analysis of bivariate data.
3.1. Representations and plots of qualitative and discrete data.
3.2. Representations and numerical summaries of quantitative data: correlation and regression.
3.3. Time series.

4. Probability and probabilistic models.
4.1. Random experiments, sample space, elementary and composite events.
4.2. Properties of probability.
4.3. Conditional probability and its properties.
4.4. Random variables and their characteristics.
4.5. Bernoulli trials and related distributions.
4.6. The normal distribution.

5. Introduction to statistical inference.
5.1. Outline and objectives.
5.2. Point estimators.
5.3. Interval estimators.
5.4. Fundamentals of hypothesis testing.
5.5. Tests for normal means.

5.6. Tests for proportions.

LEARNING ACTIVITIES AND METHODOLOGY

Theory (4ECTS). Theory classes with materials available on the web.
Prácticas (2ECTS) Problem classes. Computing classes using statistical software.
Group tutorials for resolution of problems, doubts etc.

ASSESSMENT SYSTEM

Continuous evaluation:
Two written tests counting 40% of the final grade.
Group project counting 10% of the final grade.
Continuous evaluation, exercises and practical classes, counting 10% of the final grade.

Final exam. End of course exam counting 40% of the final grade.

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

BASIC BIBLIOGRAPHY

- D. Huff How to Lie with Statistics, W.W. Norton & Company.
- D. Levitin A Field Guide to Lies and Statistics, Penguin, 2018
- Remenyi, D. et al. An introduction to statistics using Microsoft Excel , Academic Publishing, 2010

ADDITIONAL BIBLIOGRAPHY

- D. Rowntree Statistics without Tears, Penguin Books.

BASIC ELECTRONIC RESOURCES

- Michael Wiper . Teaching Page: http://halweb.uc3m.es/esp/Personal/personas/mwiper/eng/docencia.html