Statistics for social sciences II

Academic Year: (2022 / 2023) **Review date: 03-02-2023**

Department assigned to the subject: Statistics Department

Coordinating teacher: CABRAS , STEFANO

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Statistics for Social Sciences I or a similar introductory statistics course.

OBJECTIVES

Specific competences:
1. Understanding the basic concepts of statistical inference and its applications in the social sciences.
2. Capacity for applying simple linear regression and interpreting the results.
3. Capacity for applying multiple linear regression and interpreting the results.
4. Effective use of statistical software.

Transversal competences:
1. Capacity for analysis and synthesis.
2. Capacity for mathematical and statistical modeling.
3. Problem solving.
4. Critical reasoning.
5. Oral and written communication.

DESCRIPTION OF CONTENTS: PROGRAMME

Topic 1. Advanced hypothesis testing
1.1.- Comparing two populations
1.2.- ANOVA

Topic 2.Simple Linear Regression
2.1.- Motivation, examples and applications. Model formulation and parameter interpretation.
2.2.- Nonlinear relationships and linearizing transformations.
2.3.- Point and interval estimation of the model parameters.
2.4.- Hypothesis testing; statistical significance of estimated parameters.
2.5.- Model checking and residual analysis.

Topic 3.Multiple Linear Regression
3.1.- Motivation, examples and applications. Model formulation and parameter interpretation.
3.2.- Inference on model parameters: confidence intervals; inference on the response.
3.3.- Marginal effects. Adjusted R-squared.
3.4.- Multicolinearity. Residual analysis.
3.5.- Variable selection methods.
3.6.- Considering categorical variables.

Topic 4 Final Project

LEARNING ACTIVITIES AND METHODOLOGY

Theory (3 ECTS). Theory classes with supporting material available in the course's web page.

Practical classes (3 ECTS). Problem-solving classes. Practical classes in computer rooms.

Weekly individual tutoring sessions.

The teaching methodology will be eminently practical, being based on the study of diverse data sets through inference and regression techniques, both in the theory and practical classes, as motivation and illustration of the theory.

ASSESSMENT SYSTEM

Continuous evaluation: 60%. It will be based on a midterm exam (20%), a compulsory final project (35%) and on exercises to be done in the computer labs (5%).

Final exam: 40%. A minimum mark of 4.5 out of 10 in this exam is required to pass the course.

The extraordinary exam will count 100% of the final grade.

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

BASIC BIBLIOGRAPHY

- Chatterjee, S. Regression analysis by example, Wiley, 2000

- J.F. Hair, W.C. Black, B.J. Babin, R.E. Anderson Multivariate Data Analysis: A Global Perspective, 7th ed. , Pearson Education, 2010

- Remenyi, D. et al.. An introduction to statistics using Microsoft Excel., Academic Publishing. , 2010

- YOUNGER, M. S. A First Course in Linear Regression, Duxbury Press, 1985

ADDITIONAL BIBLIOGRAPHY

- D.J. Bartholomew, F. Steele, I. Moustaki, J. Galbraith Analysis of Multivariate Social Science Data, 2nd ed., Chapman & Hall/CRC, 2008