Statistics I

Academic Year: (2020 / 2021) **Review date: 15-07-2020**

Department assigned to the subject: Statistics Department

Coordinating teacher: NIÑO MORA, JOSE

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Social Sciences and Law

OBJECTIVES

SPECIFIC COMPETENCES: Develop the capacity of students to:

1. Carry out statistical analyses of univariate and bivariate data.
2. Formulate and solve basic probability problems.
3. Formulate, apply and solve basic probabilistic models.
4. Obtain point estimators for the parameters of some probability distributions.
5. Estimate by confidence intervals the mean of a population.
6. Apply statistical methods through software.

TRANSVERSAL COMPETENCES:

1. Capacity of analysis and synthesis.
2. Use of statistical software.
3. Problem solving.
4. Teamwork.
5. Critical thinking.
6. Oral and written communication.

DESCRIPTION OF CONTENTS: PROGRAMME

PROGRAMME:

1. Introduction.
1.1. Concept and use of Statistics.
1.2. Statistical terms: populations, subpopulations, individuals and samples.
1.3. Types of variables.

2. Analysis of univariate data.
2.1. Representations and graphics of qualitative variables.
2.2. Representations and graphics of quantitative variables.
2.3. Numerical summaries.

3. Analysis of bivariate data.
3.1. Representations and graphics of qualitative and discrete data.
3.2. Representations and numerical summaries of quantitative data: covariance and correlation.

4. Probability.
4.1. Random experiments, sample space, elementary and composite events.
4.2. Probability: definition and properties. Conditional Probability and the multiplication Law. Independence.
4.3. The law of total probability and Bayes' theorem.

5. Probability models.
5.1. Random variables. Discrete random variables: Probability function and distribution function. Mean and variance.
5.2. Continuous random variables: Density function and distribution function. Mean and variance.
5.3. Probability models. Discrete probability models: Bernoulli, Binomial and Poisson.
5.4. Continuous probability models: Uniform, exponential and normal.
5.5. Central limit theorem.

6. Introduction to Statistical Inference.
6.1. Point estimation of population parameters.
6.2. Goodness-of-fit of a statistical model. Graphical methods.
6.3. Introduction to confidence interval estimation.

LEARNING ACTIVITIES AND METHODOLOGY

14 theoretical classes with supporting material available on the Web, and 14 practical classes involving problem-solving and computing labs. No group tutorials are foreseen except possibly during the final class recovery week.

ASSESSMENT SYSTEM

50% of the course grade will be obtained through a final exam. The remaining 50% will be obtained through two midterm exams (20%+20%), tasks to be delivered in the computing labs (5%), and exercises to be done in some theory classes (5%). The exams can contain application exercises, theoretical questions, and questions related to the computing labs.

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

BASIC BIBLIOGRAPHY

- Newbold, P. et al. Statistics for Business and Economics, Prentice-Hall..

- Triola, M.F. Essentials of Statistics, Global Edition, 5/E, Pearson, 2014

BASIC ELECTRONIC RESOURCES

- Paul Newbold, William L. Carlson, Betty M. Thorne . Statistics for Business and Economics: Global Edition: https://www-dawsonera-com.biblioteca5.uc3m.es/abstract/9780273767084