29611 - Statistics

Información del Plan Docente

Academic Year	2018/19
Subject	29611 - Statistics
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	430 - Bachelor's Degree in Electrical Engineering
ECTS	6.0
Year	2
Semester	Half-yearly
Subject Type	Basic Education
Module	

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology proposed for this subject is to promove the continued work in the student focuses on both actual data treatment and the introduction of the fundamental aspects of Statistics. In sessions with the whole group theoretical aspects are based in the form of master class complemented by its application to solving real problems. Treatment with actual data is done in sessions in the computer lab where you learn to manage statistical computer programs.

4.2.Learning tasks

The course is divided into four hours of class a week for 15 weeks. Two hours are for exposure of theoretical concepts and examples, in the complet group, and the other two hours to develop skills in planning, resolution and interpretation of

realistic problems, in the lab class.

A problem is proposed a each student for to resolve. In addition throughout the course application proposed in a real case of the techniques presented . This activity will take place continuously during the course, making periodic reviews .

4.3.Syllabus

Module 1: Exploratory Data Analysis.

1. Exploratory analysis of a variable. descriptive measures and graphical tools

2.- Fitting distributions. Calculation of percentiles and probability plots

3. Exploratory analysis of several variables. Linear regression

Module 2: Probability and Random Variables

1. Introduction to the probability. Definition of probability. Bayes theorem. Independence

2. Random variables: Definition of random variable: discrete and continuous. Probability function. Density function. Distribution function. Characteristics of a random variable: mean, variance, skewness and direction. Chebychev inequality

3. Discrete variables: Binomial, Hypergeometric, Geometric, Negative Binomial and Poisson

4. Continuos variables: Uniform, Normal, Exponential, Gamma, Weibull

5. Poisson Process

6. Multivariate probability models

Module 3: Sampling, estimation and hypothesis test.

1. Simple random sample. Statisticians. Distributions Pearson chi-square, Student's t and Snedecor F-Fisher. central limit theorem. Fisher theorem. Calculation of sample sizes

2. Point and interval estimation. Confidence interval estimation. Confidence intervals for means, variances and proportions.

3. Hypothesis test: null and alternative hypotheses. critical region. Type I and II errors. Significance level of contrast and power. Relationship between confidence intervals and hypothesis testing. Hypothesis of means, variances and proportions. Contrasts associated with quality control: graphics Xbar, S. contingency tables. Contrast independence.

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Contrast goodness of fit. Analysis of variance of a factor

Module 4: Introduction to Optimization. Optimization problems: decision variables, objective function and constraints. Linear programming problems: graphic resolution

4.4.Course planning and calendar

Master class: 30 h .

Resolution of case studies in computer lab : 30 h .

Making report on a real case with group work : 15 h .

Personal study of theoretical aspects : 30 h.

Troubleshooting: 34 h.

Evaluation Activities : 6 h.

4.5.Bibliography and recommended resources