

29611 - Statistics

Syllabus Information

Academic Year: 2020/21

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: 430-First semester o Second semester

107-First semester

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 promote 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 complete 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 for each student 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

The course will address the following topics:

Module 1: Exploratory Data Analysis.

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

- 2.- Fitting distributions. Calculation of percentiles
3. Exploratory analysis of several variables. Regression

Module 2: Probability and Random Variables

1. Introduction to probability. Definition of probability. Bayes theorem. Independence
2. Random variables: Definition of a random variable: discrete and continuous. Probability function. Density function. Distribution function. Characteristics of a random variable: mean and variance.
3. Discrete variables: Binomial, Hypergeometric, Geometric and Poisson
4. Continuous variables: Uniform, Normal and Exponential
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. 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. The significance level of contrast. Relationship between confidence intervals and hypothesis testing. The hypothesis of means, variances and proportions. Contingency tables. Contrast independence. Contrast goodness of fit.

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: 30 h.

Making a 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

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29611&Identificador=13314>