

## 27510 - Statistics II

### Syllabus Information

**Academic Year:** 2019/20  
**Subject:** 27510 - Statistics II  
**Faculty / School:** 109 -

**Degree:** 449 - Degree in Finance and Accounting

**ECTS:** 6.0  
**Year:** 2  
**Semester:** First semester  
**Subject Type:** Compulsory  
**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

Several teaching methods will be used in the learning process, based on the objectives of the course and the competencies the students have to acquire. Expository techniques will be used in the lectures, aiming to explain and develop the basic concepts. Also collaborative techniques will be adopted to encourage the students' participation in class in order to develop their abilities to organize, plan and make decisions.

Furthermore, computer tools and solving case studies will be used to tackle the competencies related to the use of technological tools, problem solving and the ability to analyze and extract information from external sources.

Teaching materials as well as the information necessary for the development of the course, including this teaching guide, will be published in Moodle2.

#### 4.2.Learning tasks

**Lectures (30 classroom hours and 45 autonomous working hours):** They will be mainly invested in the introduction of the basic concepts and the theoretical developments of each lesson. Expository lectures will be used, always encouraging the participation and discussion in the classroom. The lectures will be supported by slides. Class attendance, participation and note-taking are highly recommended.

**Applied sessions (26 classroom hours and 33 autonomous working hours):** These activities aim to show the student how to address and solve problems. The sessions will take place either in the classroom or in the computer lab.

**Small group tutorials (4 classroom hours and 4 autonomous working hours):** They will take place in the classroom and/or in the computer lab in the established hours. The goal of these sessions is to help the student to acquire skills and facility in the resolution of statistical problems.

### 4.3.Syllabus

#### SECTION 1. DISCRETE AND CONTINUOUS RANDOM VARIABLES

Topic 1: Discrete random variable.

Random variable. Probability distribution. Discrete and continuous random variables. Discrete random variable: Probability distribution or mass functions. Expected value and its properties. Binomial, Hypergeometric and Poisson distributions.

Topic 2: Continuous random variable.

Continuous random variable: density and probability density functions. Characteristics of a continuous variable. Uniform, Exponential and Normal distributions. Continuous approximations of discrete distributions.

#### SECTION 2. INTRODUCTION TO SAMPLE THEORY

Topic 3: Introduction to sampling theory.

Basic concepts: population, sample, parameters and statistics. Sampling methods. Simple random sampling. Sampling with and without replacement. Sampling distribution of a statistics. Sample-size determination.

#### SECTION 3. INFERENCE METHODS: ESTIMATION AND HYPOTHESIS TESTS.

Topic 4: Point and interval estimation.

Concept of estimator. Point estimators. Confidence interval estimation. Construction of a confidence interval: the pivot method. Confidence intervals to estimate the population mean, the population variance and the population proportion.

Topic 5: Hypotheses testing.

Basic concepts: Simple, composite, null and alternative hypotheses, significance level, power of a test and types of errors. Parametric hypothesis testing. Hypothesis Tests about the mean and the variance of a normal distribution, tests about the Bernoulli parameter. P-value. Non parametric hypothesis tests.

#### SECTION 4. COMPARING POPULATIONS

Topic 6: Two sample inference.

Inference for comparing means, variances and proportions. Independent and paired samples. Analysis of categorical variables: contingency tables.

### 4.4.Course planning and calendar

The workload of the course is 6 ECTS credits (150 hours of study), distributed between classroom hours and individual homework in the following way:

Activities	Classroom hours	Autonomous work	Total study load
Lectures (full group)	30	45	75
Practical classes and Computer labs (two subgroups)	26	33	59
Small group tutorials (two subgroups)	4	4	8
Intermediate computers test (two subgroups)	4	0	4
Final exams	4	0	4
<b>TOTAL</b>	<b>68</b>	<b>82</b>	<b>150</b>

*Presentation of the course:* The first day of class, the objectives and contents of the course, the teaching methodology and the assessment criteria will be explained in detail.

*Intermediate computer tests:* The students will take two intermediate computer tests. The first computer test (CT1) will take

place at the end of Section 2 and the second one (CT2) at the end of Section 4.

*Final exam:* According to the official calendar established by Faculty of Economics, the students will take a final exam during the examination period that will consist of a methods and theory exam (ME), in which the competencies and skills achieved will be evaluated. The weight of this exam will be 70% of the final mark, and a computer test (CT) with a weight of 30%.

In the first sitting, the computer test will not be compulsory for the students who obtained a minimum of three points in each of the two intermediate tests.

The teaching materials developed during the course, as well as the examination calls and their results will be published in the learning platform: <http://moodle2.unizar.es>.

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#### **4.5. Bibliography and recommended resources**