



**Faculty of Tourism and Accounting**

**DEPARTMENT OF APPLIED ECONOMICS I**

**Degree in Finance and Accounting**

**SILLABUS FOR THE SUBJECT STATISTICS II  
(group 6, taught in English)**

**ACADEMIC YEAR 2016-2017**

## SYLLABUS FOR THE SUBJECT “STATISTICS II”

### BASIC FEATURES OF THE SUBJECT

**Qualification:** Degree in Finance and Accounting  
**Starting year of the degree:** 2009  
**Centre:** Faculty of Tourism and Accounting  
**Subject:** Statistics II  
**Subject code:** 1610023  
**Academic year:** 3rd year  
**Type of subject:** Core  
**Teaching term:** 1<sup>st</sup> term  
**Area in charge:** Quantitative methods for the Economy and Business  
**Number of hours:** 150  
**Credits:** 6:  
**Department:** Applied Economics I (Department in charge)  
**Postal address:** Av. Ramón y Cajal 1. 41005 (Spain)  
**Email:** <http://www.departamento.us.es/deconapli1/>

### Goals and scope.

Since this is a formal subject, the goals are mixed with the contents. The main purposes are in short:

- 1) Use of one-dimensional and multi-dimensional random-variable models.
- 2) Knowledge of point estimators for the mean, the variance, and the proportion of a population.
- 3) Estimation, by means of confidence intervals, of the mean, the variance, and the proportion of a population.
- 4) Hypothesis testing concerning the means, the variances, and the proportions of one or more than one population.
- 5) Building of punctual estimators for the parameters of a population.

### Competence skills.

#### Transversal/general skills:

Capacity for analysis and synthesis (intense training)

Capacity to attain, from the data, relevant information that non-economists would be unable to recognize (moderate training)

Capacity to discover and interpret relevant data and information in order to assess situations and provide reasoned arguments.

#### Specific skills:

Reasoning capacity for the analysis and description of any economic reality.

Knowledge and application of basic concepts of Statistics and Statistical Inference.

### Contents of the subject (short description)

One-dimensional random variables.

One-dimensional probabilistic models.

Random vectors.

Introduction to Statistic Inference.

Statistic Inference in Normal populations. Exact methods.

Asymptotical properties. Big samples.

General theory and estimation point methods.

## **Distribution of the contents**

### **Chapter 0. Probability (6 hours)**

Definition of probability. Conditional probability. Independence of events. Total probability.

### **Chapter 1. Discrete random variables (8 hours)**

Concept of discrete random variable: Probability mass function and cumulative distribution function. Probabilities of intervals. Mode, expected value, variance and standard deviation. Linear transformations. Counting variables: Bernoulli, Binomial, Geometric, Negative Binomial, Hypergeometric and Poisson models.

### **Chapter 2. Continuous random variables. Tchebychev's inequality (10 hours)**

Concept of continuous random variable: Density function and cumulative distribution function. Probabilities of intervals. Mode, expected value, variance and standard deviation. Percentiles. Linear transformations: Standardisation. Variables of measure: Uniform, Exponential, Pareto, Normal, Gamma and Beta models. Tchebychev's inequality.

### **Chapter 3. Two-dimensional discrete random vectors (4 hours)**

Concept of two-dimensional discrete random vector: Joint, marginal and conditional distributions. Conditional expected value. Independence. The covariance: Pearson's coefficient of correlation.

### **Chapter 4. Two-dimensional continuous random vectors (2 hours)**

Concept of two-dimensional continuous random vector: Joint, marginal and conditional distributions. Conditional expected value. Independence. The covariance: Pearson's coefficient of correlation.

### **Chapter 5. Laws of great numbers and the Central limit theorem. (4 hours)**

### **Chapter 6. Introduction to Statistical Inference (3 hours)**

Concepts of population and sample. The population as the generating data model. The sample as a random  $n$ -dimensional vector. Simple random sampling. Parametric space and goals of the Statistical Inference.

### **Chapter 7. Statistics in sampling. Normal populations (4 hours)**

Concept of statistic: maximum, minimum, sample mean and sample variance. The case of simple random sampling: properties of the sample mean and of the sample variance. Normal populations.

### **Chapter 8. Statistical Inference in Normal populations. Exact methods (10 hours)**

Chi-square, Student's  $t$  and Fisher's  $F$  models. Confidence intervals and hypothesis testing in Normal populations.

### **Chapter 9. Asymptotical properties. Application to samples of large size (3 hours)**

Confidence intervals and hypothesis testing for based on samples of large size for Bernoulli's and Poisson's populations.

### **Chapter 10. General theory and point estimation (6 hours)**

Concepts of estimator and estimation. Unbiased estimators. Mean squared error of an estimator. Estimation methods: method of the moments and method of the maximum likelihood.

### Teaching activities.

#### Classes:

Attendance hours: 60

Non-attendance hours. 0

#### Teaching and learning methodology:

Magisterial classes.

Learning based on problem solving.

### Student's work.

Attendance hours: 0.

Study hours: 90.

#### Teaching and learning methodology:

Individual work.

Work in groups.

Study and preparation of the subject.

Exams.

## TEACHING RESOURCES AND BIBLIOGRAPHY

The whole content of the subject (theory and practical exercises) will be available on the web platform of the subject. The students are advised to download it and to complete it with additional notes during the class. They can also take references from the following bibliography:

### In Spanish

#### General bibliography

<b><i>Inferencia estadística para Economía y Administración de Empresas</i></b>	
Autores: CASAS SÁNCHEZ, J.M.	Edición: 2000
Publicación: Centro de Estudios Ramón Areces, S.A.	ISBN: 84-8004-195-1
<b><i>Estadística Aplicada: Economía y Ciencias Sociales</i></b>	
Autores: MURGUI, S. - ESCUDER, R.	Edición: 2011
Publicación: Tirant lo Blanch Libros	ISBN: 9788499850818
<b><i>Modelos Probabilísticas y Tablas Estadísticas</i></b>	
Autores: PÉREZ DE LOS RÍOS, J.L.	2ª Edición revisada
Publicación: Editorial Digital@tres, S.L.L.	ISBN: 84-95499-84-3
<b><i>Cálculo de Probabilidades y Estadística</i></b>	
Autores: ROJO, J.L.- GUIJARRO, M.M. – SANZ, J.A. y otros	1ª Edición: 1994
Publicación: Ariel	ISBN: 84-344-2094-5
<b><i>Fundamentos de la Inferencia Estadística</i></b>	
Autores: RUIZ-MAYA, L. – MARTÍN PLIEGO, J.	3ª Edición: 2005
Publicación: AC	ISBN: 9788497323543
<b><i>Cálculo de Probabilidades</i></b>	
Autores: UÑA, I. – TOMELO, V.- SAN MARTÍN, J.	Edición: 2005
Publicación: Thomson	ISBN: 84-92812-11-7

<b><i>Problemas de Inferencia Estadística</i></b>	
Autores: ROJO, J.L.- GUIJARRO, M.M. – SANZ, J.A. y otros	1ª Edición: 1995
Publicación: Ariel	ISBN: 84-344-0483-4
<b><i>Inferencia Estadística</i></b>	
Autores: ESTEBAN GARCÍA, J.- BACHERO NEBOT, J.E.- IVARS ESCORTELL, A.- LÓPEZ RODRÍGUEZ, M.I.- ROJO OLIVA, C.- RUIZ PONCE, F.	Edición 2011
Publicación: Ibergarceta Publicaciones S.L.	ISBN: 978-84-9281-11-7
<b><i>Ejercicios de Cálculo de Probabilidades (resueltos y comentados)</i></b>	
Autores: ROJO, J.L.- GUIJARRO, M.M.- SANZ, J.A.- FERNÁNDEZ-ABASCAL, H.	Edición 1995
Publicación: Ariel	ISBN: 84-344-0483-4

### In English

#### Finance and Economic approach

<b><i>Probability and Statistics for Finance</i></b>	
Authors: SVETLOZAR T. RACHEV et al.	Edition: 2010
Published by John Wiley & Sons	ISBN: 978-0-470-40093-7
<b><i>Statistics for Business and Economics</i></b>	
Authors: ANDERSON, D.R. –SWEENEY, D.J. et al.	Edition: 2011
Published by Cengage Learning International Edition	ISBN: 13: 978-0-538-47188-6
<b><i>Managerial Statistics</i></b>	
Author: KELLER, G.	Edition: 2009
Published by Cengage Learning International Edition	ISBN: 13: 978-1-111-53463-9
<b><i>Statistics for Economics, Accounting and business studies</i></b>	
Author: BARROW, M.	5 <sup>th</sup> Edition: 2009
Published by Pearson Education Limited	ISBN: 13:978-0-273-71794-2
<b><i>Statistics for Business</i></b>	
Author: DEREK L. WALLER	First Edition: 2008
Published by Elsevier Inc.	ISBN: 978-0-7506-8660-0
<b><i>Statistics for Business and Economics</i></b>	
Authors: NEWBOLD, P. – CARLSON, W.L. – THORNE, B.	5 <sup>th</sup> Edition: 2003
Published by Pearson Education International	ISBN: 0-13-04728-7
<b><i>Statistics for Economists</i></b>	
Author: Bowers, D.	Edition: 1982
Published by The Mac Millan Press LTD	ISBN: 0 333 30110 2
<b><i>Statistics for Business and Financial Economics</i></b>	
Authors. LEE, C.F et al.	2 <sup>nd</sup> Edition: 2000
Published by World Scientific	ISBN: 981-02-3485-6

## Mathematical approach

<i>Statistical Inference</i>	
Authors: CASELLA, G. – BERGER, R.E.	Edition: 1990
Published by Wadsworth Inc.	ISBN: 0-534-11958-1
<i>Statistics: With a View Toward Applications</i>	
Author: BREIMAN, L.	Edition: 1973
Published by Houghton Mifflin Company	ISBN: 0-395-04232-1

## General approach

<i>Basic Statistics for the Behavioural Sciences</i>	
Authors: HOPKINS, K.N. – GLASS, G.V. – HOPKINS, B. R.	2 <sup>nd</sup> Edition: 1978
Published by Prentice Hall. Inc.	ISBN: 0-13-069402-9

### Criteria for the evaluation and marks.

#### Continuous evaluation: Exams and personal work

The students will have the possibility to pass the subject before the final exam by means of a continuous evaluation that will consist of:

- Theory and practical exams carried out in class.
- Assignments they will be asked to do throughout the term that can add up to 0.5 additional points.

The first mark of the continuous evaluation will consist of two exams from Chapter 0 to Chapter 5. (Part I of the subject). The second mark will be that of an exam that will cover the rest of the chapters (Part II of the subject). Each exam will have two parts according to the following structure:

- The first part will consist of a series of theory questions which will focus on concepts and methods. Students will have to choose from between a selection of four answers for every question, whereby only one answer will be correct. Every wrong answer will be penalized by - 0.25 points, whereas a correct answer will provide 1 point and any unanswered questions will not be taken into account either positively or negatively. The mark for this part will be calculated by translating the total sum of the points into a mark on a scale of zero to ten and its weight will be 30% of the exam mark.
- The second part will be essentially practical and will consist of one or several exercises in order to assess the students' ability to solve problems and their level of familiarity with the contents of the subject. The weight of this part will be 70% of the mark.

Both parts of the subjects will represent 50% of the final mark and the final mark will be obtained as the simple average of the two previous marks.

The students will not be allowed any help or consultation element during the exam for the theoretical part of the exams. For the second part they will be allowed to make use of the following elements:

- A calculator that they must carry to the exam. Small programmable calculators will be admitted provided their memory does not contain any extra information that may alter the conditions of equality which must exist for all the students who sit the exam.
- A sheet of paper with some short information could in some cases be provided by the teachers of the subject. In that case, no additional written notes will be allowed.
- Statistical tables necessary for calculations, with no additional notes.

Mobile phones or similar devices are strictly prohibited in the exams and the students will have to have them out of their reach.

### **Final exam.**

For those students who have not passed the subject by means of the continuous evaluation way a final exam will take place. However, they will only be asked to sit the parts (I or II) they didn't manage to pass. Those who have already passed the subject and want to improve their mark will have to take the exam of the whole subject. The structure of the final exam will be the same as explained above.

Once the marks of the subject are published, a period of time will be given for consultation, revision and appeal against these marks. After this period, the marks will be considered as definitive.

## **DATES AND PLACES FOR THE EXAMS**

### **3er official call**

Date: 23/11/2016 at 13:30 hours.

Location: To be determined.

### **1st official call**

Date: 01/02/2017 at 11300 hours.

Location: To be determined.

### **2nd official call**

Date: 08/09/2017 at 18:30 hours.

Location: To be determined.

**These times and places may suffer changes: the definitive calls will be published on the notice boards and on the web at least ten days before the exam takes place.**

## **APPEAL AND EVALUATION BOARD**

Members: Jesús Basulto Santos (president), José Antonio Camúñez Ruiz (secretary) and Carlos Arias Martín.

1<sup>st</sup> Deputy member: Ana María Domínguez Quintero.

2<sup>nd</sup> Deputy member: Luis Franco Martín.

3<sup>rd</sup> Deputy member: Francisco Javier Gamero Rojas.

**Classes of Group 6:** Tuesdays 9:30-11:30 and Thursdays 11:30-13:30. Location: Computer's room no 2

**Teacher in charge:** Luis Sánchez-Reyes Fernández. **Office:** 4.08 on the 4<sup>th</sup> floor of the Faculty of Management and Economics (wing over the bar). **Email:** [luiss-rf@us.es](mailto:luiss-rf@us.es)

**Tutorial time** (1<sup>st</sup> term): Tuesdays 12-14:30, Wednesdays 11-14:30.