



## TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Business Statistics
Subject code	E000005832
Main program	<a href="#">Bachelor's Degree in Business Administration and Management</a>
Involved programs	Grado en Administración y Dirección de Empresas y Grado en Derecho (E-3 16) [Third year] Grado en Administración y Dirección de Empresas (E-2) - Bilingüe en inglés [Second year]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	6,0 ECTS
Type	Obligatoria (Grado)
Department	Departamento de Métodos Cuantitativos
Coordinator	Francisco Borrás Palá
Office hours	pedir cita (fborras@icade.comillas.edu)

Teacher Information	
<b>Teacher</b>	
Name	Antonio Rúa Vieites
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23 [OD-419]
E-Mail	rvieites@icade.comillas.edu
<b>Teacher</b>	
Name	Carlos Álvarez Fernández
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23
E-Mail	calvarez@icade.comillas.edu
Phone	
<b>Teacher</b>	
Name	José María Ortiz Lozano
Department	Departamento de Métodos Cuantitativos
E-Mail	jmortiz@comillas.edu
<b>Teacher</b>	
Name	Lucía Barcos Redín
Department	Departamento de Gestión Empresarial
Office	Alberto Aguilera 23 [C-429]
E-Mail	lbarcos@icade.comillas.edu



Phone	2282
<b>Teacher</b>	
Name	Tomás Curto González
Office	Alberto Aguilera 23 [CD-435]
E-Mail	tcurto@icade.comillas.edu
<b>Teacher</b>	
Name	Francisco Borrás Palá
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23 [CD-427]
E-Mail	fborras@icade.comillas.edu
<b>Teacher</b>	
Name	Alex Escolá Gascón
Department	Departamento de Métodos Cuantitativos
E-Mail	aescola@icade.comillas.edu
<b>Teacher</b>	
Name	Bárbara Sáiz de Bustamante Pérez
Department	Departamento de Métodos Cuantitativos
E-Mail	bsaizbustamante@icai.comillas.edu
<b>Teacher</b>	
Name	Eduardo César Garrido Merchán
Department	Departamento de Métodos Cuantitativos
E-Mail	ecgarrido@icade.comillas.edu
<b>Teacher</b>	
Name	Leandro Sergio Escobar Torres
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23
E-Mail	lescobar@icade.comillas.edu
Phone	
<b>Teacher</b>	
Name	María del Mar Angulo Martínez
Department	Departamento de Métodos Cuantitativos
E-Mail	mmangulo@icade.comillas.edu

## SPECIFIC DATA OF THE SUBJECT

---



## Contextualization of the subject

### Contribution to the professional profile of the degree

Subject of instrumental character that allows to know the elements that take part in the business decision making in uncertainty environment, providing tools for:

- Summarize the statistical information and obtain measures of it Measure the uncertainty of random phenomena
- Analyze the behavior of random variables
- Produce generalizations from sample information

It is, on the other hand, a basic tool for its use in other matters: Quantitative Models for the Economy and Business, Fundamentals of Finance, Corporate Finance, Market Research, etc. ..., in which knowledge of reality and Decision-making on issues addressed in them are based on the knowledge of situations and events characterized by uncertainty.

### Prerequisites

Knowledge of mathematical analysis of one and several variables.

## Competencies - Objectives

### Competences

#### GENERALES

<b>CG01</b>	Capacidad de análisis y síntesis	
	<b>RA1</b>	Analiza la información identificando sus elementos más significativos
	<b>RA2</b>	Realiza la abstracción y simplificación necesaria para modelizar estadísticamente el problema real planteado
	<b>RA3</b>	Integra el análisis gráfico, verbal y los datos cuantitativos y cualitativos para definir el modelo estadístico apropiado al problema
<b>CG08</b>	Conocimientos de informática relativos al ámbito de estudio	
	<b>RA1</b>	Conoce y emplea de forma suficiente herramientas informáticas de uso común para el análisis estadístico

#### ESPECÍFICAS

<b>CE10</b>	Capacidad para tratar, sintetizar y analizar la información. Conociendo los fenómenos aleatorios y los procesos de inferencia estadística	
	<b>RA1</b>	Conoce, diferencia y emplea los conceptos estadísticos para el análisis de la información- Identificación de variables, codificación y presentación sistemática de los datos
	<b>RA2</b>	Deduce información estadística relevante de un conjunto de datos
	<b>RA3</b>	Analiza e interpreta correctamente las relaciones entre distintas variables



<b>RA4</b>	Comprende y aplica correctamente los conceptos fundamentales de la teoría de la probabilidad
<b>RA5</b>	Comprende el concepto de variable aleatoria, discreta o continua, y elabora correctamente su distribución de probabilidad.
<b>RA6</b>	Conoce la distribución de probabilidad conjunta de dos variables, analizando correctamente las relaciones de asociación y/o dependencia entre ellas
<b>RA7</b>	Conoce distintos tipos de muestreo. Determina correctamente probabilidades en el caso de Muestro Aleatorio Simple
<b>RA8</b>	Reconoce y diferencia la aplicación de distintos métodos de estimación y contrastación, adecuados al tipo de información disponible y a los objetivos pretendidos.
<b>RA9</b>	Aplica correctamente los métodos de inferencia a situaciones reales sencillas, tomando decisiones oportunas e interpretándolas correctamente

## THEMATIC BLOCKS AND CONTENTS

### Contents - Thematic Blocks

#### PART 1: DATA DESCRIPTION

##### Topic 1: Statistics and data analysis in the era of big data

1.1. Big Data

1.2. Application examples

##### Topic 2: Descriptive statistics

2.1. Basic concepts

2.1. Classifications of variables and data.

2.2. Frequencies.Frequency tables

2.4. Graphs

2.5. Numerical summary of the data: measures of central tendency and position, measures of dispersion, measures of form, measures of concentration.

2.6. Analysis of the dependence between two variables

2.7. Weighted mean and geometric mean

#### PART 2: PROBABILITY THEORY

##### Topic 3: Uncertainty and its measure

3.1. Random phenomena and events

3.2. Concept of probability and its axioms



- 3.3. Conceptions of probability
- 3.4. Practical rules of the probability
- 3.5. Important details when working with events and probabilities
- 3.6. Conditional probability. Independent events
- 3.7. Rectification of the probability of an event. Bayes theorem

#### **Topic 4: Random Variables**

- 4.1. Basic concepts
- 4.2. Discrete random variable
- 4.3. Some models of discrete variable: Binomial and Poisson
- 4.4. Continuous random variable
- 4.5. Some models of continuous variable: Uniform and Normal

### **PART 3: STATISTICAL INFERENCE**

#### **Topic 5: Introduction to inference and simple random sampling**

- 5.1. Basics of inference
- 5.2. Simplified random sampling
- 5.3. Distribution of sample
- 5.4. Distribution of statistics

#### **Topic 6: Parameter estimation**

- 6.1. Estimation
- 6.2. Methods for obtaining point estimators
- 6.3. Properties of point estimators
- 6.4. Confidence intervals

### **TEACHING METHODOLOGY**

#### **General methodological aspects of the subject**

The methodology is varied, combining face-to-face and non-face-to-face, individual and group, conceptual and practical application activities using data and computer applications.

#### **In-class Methodology: Activities**



<p>Keynote presentation of the general framework of each topic deepening the key concepts</p> <p>Realization and discussion of examples of practical application to deepen the concepts</p> <p>Basic introduction to the use of computer applications for statistical data processing</p> <p>Performing small online elementary level tests to review the concepts developed in each master class. Immediately after, they will be corrected in class to provide students with information about their learning</p> <p>Performing exercises and / or case studies in class</p> <p>Resolution of doubts of online practices, in order to provide information about their learning</p> <p>Two or three intermediate tests of the basic blocks of the subject</p> <p>Completion of the final exam of the subject</p>	CG01, CE10, CG08
---	------------------

### Non-Presential Methodology: Activities

<p>Study and deepening of concepts Practical application of computer tools presented in class</p> <p>Consultation of specific questions in individual or group tutoring Online practice</p> <p>They will be more complex tests than online class tests. Some of them will require the application of computer applications for statistical data processing</p> <p>Performing exercises and / or case studies outside of class</p> <p>Final exam preparation</p>	CG01, CG08, CE10
---	------------------

### SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS		
Lecciones de carácter expositivo	Ejercicios y resolución de casos y de problemas	
40.00	50.00	
NON-PRESENTIAL HOURS		
Ejercicios y resolución de casos y de problemas	Estudio individual y/o en grupo y lectura organizada	Trabajos monográficos y de investigación, individuales o colectivos
30.00	30.00	30.00
<b>ECTS CREDITS: 6,0 (180,00 hours)</b>		

### EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
	<p>Numerical Rating 0-10.</p> <p>Priority will be given to understanding concepts and their application in practical cases, over mere numerical calculation.</p> <p><b>VERY IMPORTANT: The exam must have a score</b></p>	



<p><b>FINAL EXAM:</b> A final exam of the subject will be carried out (common to the corresponding groups), whose content is the entire program.</p>	<p><b>of at least 4.50 out of 10 to pass the subject.</b></p> <p>80% of the exam grade will correspond to multiple-choice questions (without penalty), and the remaining 20% will be open questions.</p> <p><b>To correct the open questions, it will be necessary for the score of the multiple-choice part to be equal to or greater than 3.5 out of 10.</b> If this requirement is not met, the final exam grade will be the score out of 10 of the multiple-choice part.</p>	<p>60 %</p>
<p><b>CONTINUOUS EVALUATION TESTS:</b> 5 to 6 tests will be carried in the semester (one or two per topic approximately).</p>	<p>Numeric rating 0-10.</p> <p>Short tests of about 15-25 minutes (100% test type) will always be done in person.</p> <p>Priority will be given to understanding the concepts and their application in practical cases, over mere numerical calculation.</p> <p>The tests not carried out will have a 0, unless the absence is due to a justified cause by the tutor of the group. In this case, the test will be annulled and its percentage in the average of the tests will increase that of the final exam. For the average of these tests, the worst grade will be eliminated, except for the last test, which will always be included in such average. This final mandatory test will be conducted on the third-to-last or second-to-last day of the semester for the subject.</p>	<p>20 %</p>
<p><b>ACTIVE PARTICIPATION OF THE STUDENT INSIDE AND OUTSIDE THE CLASSROOM:</b></p>	<p>Numeric rating 0-10.</p> <p>To evaluate it, exercises/case studies and learning games will be carried out. They can be done online (some of them can be collaborative), during class time or as homework. The score will not be taken into account, only its completion or not. Eventually it will also be possible to do a roll call in some classes.</p>	<p>10</p>
<p><b>GROUP WORK OUTSIDE THE CLASSROOM:</b></p> <p>Practical work in group, with the objective of statistical treatment of real data and the aim of applying topics 4, 5 and 6. It can be done inside or outside the classroom.</p>	<p>Numeric rating 0-10.</p> <p>At the teacher's discretion, it may be evaluated through an exercise with questions about it.</p> <p>This work will have 2 phases, one in topic 4 (50% of its final grade) and another in topic 6 (50% of its final grade).</p> <p>Teacher reserves the right to request an oral defense</p>	<p>10</p>



of the practical work of the subject, which may modify the work grade.

## Ratings

**The use of Chat GPT or similar Artificial Intelligence tools during the completion of tests, practical assignments, or the final exam will be considered as fraud and will result in a grade of "0" for the regular session and the loss of the second call opportunity.** In any case, the teaching team of the subject encourages the use of these tools in studying and preparing for the course. They consider it a very useful tool for raising questions and preparing practical exercises, although always under the responsibility of the student, as the answers it provides may not be entirely accurate.

Students in **ORDINARY CALL** (1st call) and **EXTRAORDINARY** (2nd call): the same grading system will be followed: all the components of continuous evaluation carried out during the course are weighted.

- It is an essential requirement to pass the subject in any of the calls that the exam obtains a grade of at least 4.5 points (on a scale of 0 to 10 points). In any case, the average mark considering all the evaluation items must be greater than 5.

In the first and second calls, if the final exam has a grade lower than 4.5, the student's final grade will be the lower of these two: a) exam grade; b) the one that results from making the average with all the evaluation items.

It will be possible to obtain **up to 0.5 extra points for participation in various voluntary activities** proposed by the teacher.

At the discretion of each teacher, there may be an additional test to determine the students who are awarded the Honors.

**EXCHANGE STUDENTS (OUT) AND REST OF CALLS** (3rd and following): The final grade will be 100% of the exam grade, unless they agree with the teacher to carry out the class tests, in which case the grade will be the best among these 2 options: 100% exam 70% exam-30% class tests.

**Students with SCHOOL WAIVERS** and exceptional situations: this will be dealt with on a case-by-case basis, seeking a balance between equity and learning objectives.

## WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
First delivery of the practical work	At the end of topic 4	At the end of topic 4
Second delivery of practical work	At the end of topic 6	At the end of topic 6

## BIBLIOGRAPHY AND RESOURCES

### Basic Bibliography

- *Estadística Empresarial en 101 ejemplos (volumen I)*. **Borrás Palá, F.; Martínez de Ibarrea Zorita, C; Escobar Torres, L.S.**, Edit EV Services





- *Estadística Empresarial en 101 ejemplos (volumen II)*. **Borrás Palá, F.; Martínez de Ibarrrtea Zorita, C; Escobar Torres, L.S.**, Edit EV Services
- *Estadística para administración y Economía. 8ª edición (castellano)* .**Newbold,P; Carlson,W.L.;Thorne, B.**. Edit.Pearson Prentice Hall
- *Statistics for Business and Economics. 8ª Edition (English)*. **Newbold,P; Carlson,W.L.;Thorne, B.**. Edit.Pearson Prentice Hall
- *Estadística: Problemas resueltos*. **Peralta, M.J; Rua Vieites, A.; Redondo Palomo, R.; del Campo Campos, C**. Editorial Pirámide (2007)

## Complementary Bibliography

- *Introducción a la estadística económica y empresarial (teoría y práctica)*. **Martín Pliego, J**. Editorial Thomson.(2004)
- *Fundamentos de Probabilidad*. 2ª edición **Martín Pliego, J., Ruiz Maya, L**. Editorial Thomson. (2006)
- *Fundamentos de Inferencia Estadística*. 3ª edición **Martín Pliego, J., Ruiz Maya, L**. Editorial Thomson (2004).
- *Inferencia Estadística*. **Casas Sánchez, J.M**. Editorial Centro de Estudios Ramón Areces (1997)
- *Ejercicios de inferencia estadística y muestreo para economía y administración de empresas*. **Casas Sánchez, J.M; García Pérez, C; Rivera Galicia, L; Zamora Sanz, A** (2006). Edit. Pirámide
- *Probabilidad y Estadística*. **DeGroot, M.H**. Addison Wesley Iberoamericana (1988)

In compliance with current regulations on the **protection of personal data**, we would like to inform you that you may consult the aspects related to privacy and data [that you have accepted on your registration form](#) by entering this website and clicking on "download"

[https://servicios.upcomillas.es/sedelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792](https://servicios.upcomillas.es/sedeelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792)