Syllabus
2025 - 2026

TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Business Statistics
Subject code	E000005832
Mainprogram	Bachelor's Degree in Business Administration and Management
Involved programs	Grado en Administración y Dirección de Empresas y Grado en Derecho (E-3 16) [Third 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	
Teacher	
Name	Antonio Rúa Vieites
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23 [OD-419]
EMail	rvieites@icade.comillas.edu
Teacher	
Name	Carlos Álvarez Fernández
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23
EMail	calvarez@icade.comillas.edu
Phone	
Teacher	
Name	José María Ortiz Lozano
Department	Departamento de Métodos Cuantitativos
EMail	jmortiz@comillas.edu
Teacher	
Name	Lucía Barcos Redín
Department	Departamento de Gestión Empresarial
Office	Alberto Aguilera 23 [C-429]
EMail	lbarcos@icade.comillas.edu

Phone	2282
Teacher	
Name	Tomás Curto González
Office	Alberto Aguilera 23 [CD-435]
EMail	tcurto@icade.comillas.edu
Teacher	
Name	Francisco Borrás Palá
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23 [CD-427]
EMail	fborras@icade.comillas.edu
Teacher	
Name	Alex Escolá Gascón
Department	Departamento de Métodos Cuantitativos
EMail	aescola@icade.comillas.edu
Teacher	
Name	Bárbara Sáiz de Bustamante Pérez
Department	Departamento de Métodos Cuantitativos
EMail	bsaizbustamante@icai.comillas.edu
Teacher	
Name	Eric Macías Fassio
Department	Departamento de Métodos Cuantitativos
EMail	emacias@comillas.edu
Teacher	
Name	José Luis Arroyo Barrigüete
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23 [CD-428]
EMail	jlarroyo@icade.comillas.edu
Teacher	
Name	Leandro Sergio Escobar Torres
Department	Departamento de Métodos Cuantitativos
Office	Alberto Aguilera 23
EMail	lescobar@icade.comillas.edu
Phone	
Teacher	
Name	María del Mar Angulo Martínez

Department	Departamento de Métodos Cuantitativos
EMail	mmangulo@icade.comillas.edu
Teacher	
Name	Olaya García Vázquez
Department	Departamento de Métodos Cuantitativos
EMail	ogarciav@comillas.edu
Teacher	
Name	Víctor Pérez Segura
Department	Departamento de Métodos Cuantitativos
EMail	vperezs@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

CG01	Capacidad de análisis y síntesis	
	RA1	Analiza la información identificando sus elementos más significativos
	RA2	Realiza la abstracción y simplificación necesaria para modelizar estadísticamente el problema real planteado

	RA3	Integra el análisis gráfico, verbal y los datos cuantitativos y cualitativos para definir el modelo estadístico apropiado al problema
CG08	Conocimientos de informática relativos al ámbito de estudio	
	RA1	Conoce y emplea de forma suficiente herramientas informáticas de uso común para el análisis estadístico
ESPECÍFICAS		
CE10	Capacidad para tratar, sintetizar y analizar la información. Conociendo los fenómenos aleatorios y los procesos de inferencia estadística	
	RA1	Conoce, diferencia y emplea los conceptos estadísticos para el análisis de la información- Identificación de variables, codificación y presentación sistemática de los datos
	RA2	Deduce información estadística relevante de un conjunto de datos
	RA3	Analiza e interpreta correctamente las relaciones entre distintas variables
	RA4	Comprende y aplica correctamente los conceptos fundamentales de la teoría de la probabilidad
	RA5	Comprende el concepto de variable aleatoria, discreta o continua, y elabora correctamente su distribución de probabilidad.
	RA6	Conoce la distribución de probabilidad conjunta de dos variables, analizando correctamente las relaciones de asociación y/o dependencia entre ellas
	RA7	Conoce distintos tipos de muestreo. Determina correctamente probabilidades en el caso de Muestro Aleatorio Simple
	RA8	Reconoce y diferencia la aplicación de distintos métodos de estimación y contrastación, adecuados al tipo de información disponible y a los objetivos pretendidos.
	RA9	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. Independient 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

Keynote presentation of the general framework of each topic deepening the key concepts Realization and discussion of examples of practical application to deepen the concepts Basic introduction to the use of computer applications for statistical data processing 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 Performing exercises and / or case studies in class Resolution of doubts of online practices, in order to provide information about their learning Two or three intermediate tests of the basic blocks of the subject Completion of the final exam of the subject	CG01, CG08, CE10

Non-Presential Methodology: Activities

Study and deepening of concepts Practical application of computer tools presented in class Consultation of specific questions in individual or group tutoring Online practice They will be more complex tests than online class tests. Some of them will require the application of computer applications for statistical data processing	CG01, CG08, CE10

Performing exercises and / or case studies outside of class Final exam preparation	

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
ECTS CREDITS: 6,0 (180,00 hours)		

EVALUATION AND CRITERIA

The use of AI to produce full assignments or substantial parts thereof, without proper citation of the source or tool used, or without explicit permission in the assignment instructions, will be considered plagiarism and therefore subject to the University's General Regulations.

Evaluation activities	Evaluation criteria	Weight
FINAL EXAM: A final exam of the subject will be carried out (common to the corresponding groups), whose content is the entire program. The weight of the exam will be reduced to 60% if the final average grade of the continuous assessment tests exceeds the grade of the exam	Numerical Rating 0-10. Priority will be given to understanding concepts and their application in practical cases, over mere numerical calculation. **VERY IMPORTANT: The exam must have a score of at least 4.50 out of 10 to pass the subject.** 80% of the exam grade will correspond to multiple-choice questions (without penalty), and the remaining 20% will be open questions. **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.** If this requirement is not met, the final exam grade will be the score out of 10 of the multiple-choice part.	70
	Numeric rating 0-10. Short tests of about 15-25 minutes (100% test type)	

CONTINUOUS EVALUATION TESTS: 5 to 6 tests will be carried in the semester (one or two per topic aproximately). The weight of the tests will increase to 30% if their average grade exceeds the final exam grade	will always be done in person. Priority will be given to understanding the concepts and their application in practical cases, over mere numerical calculation. 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.	20
GROUP WORK OUTSIDE THE CLASSROOM: 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.	Numeric rating 0-10. At the teacher's discretion, it may be evaluated through an exercise with questions about it. This work will have 2 phases, one in topic 4 (60% of its final grade) and another in topic 6 (40% of its final grade). Teacher reserves the right to request an oral defense of the practical work of the subject, which may modify the work grade.	10

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.

Wearing a **Smartwatch is not allowed** during continuous assessment tests or the final exam. **Only basic calculators** (with functions for addition, subtraction, multiplication, division, and square root) are permitted, as more advanced calculators are not necessary.

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

COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI ICADE CIHS

Syllabus
2025 - 2026

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/sedeelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792