



# COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

**Syllabus**  
**2024 - 2025**

## TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Data Analysis and Visualization
Subject code	E000011443
Main program	<a href="#">Bachelor's Degree in Business Administration and Management (E-2)</a>
Involved programs	Grado en Administración y Dirección de Empresas (E-2) [First year] Grado en Administración y Dirección de Empresas con Mención en Internacional (E-4) [First year] Grado en Administración y Dirección de Empresas y Grado en Relaciones Internacionales [First year] Grado en Administración y Dirección de Empresas (E-2) - Bilingüe en inglés [First year] Grado en Ingeniería en Tecnologías Industriales y Grado en Administración y Dirección de Empresas [Second year] Grado en Psicología y Grado en Administración y Dirección de Empresas [First year]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	6,0 ECTS
Type	Básico
Department	Departamento de Métodos Cuantitativos
Coordinator	Carlos Martínez de Ibarreta Zorita
Office hours	upon appointment by e-mail

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## SPECIFIC DATA OF THE SUBJECT

**Contextualization of the subject**



## Contribution to the professional profile of the degree

The "data analysis and visualization" course aims to provide the student with an introductory and transversal vision, applicable to all areas of business administration, of how to use data as a support for decision making.

Working with data consists of several phases that go from obtaining raw data to obtaining knowledge: obtaining, enriching, cleaning, summarizing, visualizing, analyzing, drawing conclusions and communicating the results. All this in the context of a business problem and with the objective of generating recommendations that help decision making.

The course is aligned with the achievement of Learning Goal No. 5. Specifically, the intended general learning objective is: To know how to communicate effectively to a non-technical audience, facts, conclusions and recommendations based on data, using digital presentation and visualization tools.

The course will use Excel primarily as a computer tool to support the processing and analysis of data and will use concepts and basic descriptive statistics to tabulate, summarize, visualize and analyze the information, but goes much further, with a holistic approach across the board. It cannot be subsumed into an "advanced spreadsheet" course or considered equivalent to traditional "descriptive statistics" disguised under another name.

However, thanks to the varied, attractive and simple examples that are intended to be used, the student, even being a first year student, can have the basic tools to be able to work autonomously using data in any of the disciplines that require it (which nowadays are almost all) and what is more important, having a positive vision and engagement with the use of data.

## Competencies - Objectives

### Competences

#### GENERALES

<b>CG2</b>	Capacidad de gestionar información y datos provenientes de fuentes diversas para hacer un análisis crítico y un correcto diagnóstico de la realidad empresarial.	
	<b>RA1</b>	A partir de la información y datos obtenidos de fuentes diversas, identifica problemas empresariales determinando, el origen/las causas de los mismos
	<b>RA2</b>	Es capaz de realizar dicho proceso de diagnóstico dando y recibiendo feed-back de forma asertiva, que ayude a incrementar la integración y la confianza en los equipos de trabajo.
<b>CG3</b>	Capacidad para la resolución de problemas y toma de decisiones empresariales seleccionando y aplicando adecuadamente las técnicas pertinentes de análisis de datos	
	<b>RA1</b>	Identifica, captura y analiza de forma eficiente datos de fuentes primarias y secundarias que sean necesarios para el análisis del entorno competitivo de la empresa
		Aplica los conceptos matemáticos y técnicas cuantitativas y cualitativas de análisis de datos necesarios



	<b>RA2</b>	para la resolución de problemas empresariales y apoyar el diagnóstico y toma de decisiones en la empresa.
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## ESPECÍFICAS

<b>CE01</b>	Capacidad para tratar, sintetizar y analizar información de fuentes y bases de datos profesionales micro y macroeconómicas, a través del manejo de la hoja de cálculo y herramientas de visualización de datos	
	<b>RA1</b>	Sabe extraer información y datos de la web, así como los fundamentos sobre diseño y obtención de información mediante cuestionarios
	<b>RA2</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>RA3</b>	RA3 Deduce información estadística relevante de un conjunto de datos y analiza e interpreta correctamente las relaciones entre distintas variables
	<b>RA4</b>	Maneja con soltura de la hoja de cálculo como herramienta básica para el análisis de datos y conoce y emplea de forma básica alguna herramienta informática de uso común para análisis estadístico y visualización de resultados

## THEMATIC BLOCKS AND CONTENTS

### Contents - Thematic Blocks

The design of the course is by PROJECTS, so that the contents and thematic blocks are not presented sequentially, but advance simultaneously as required by the different cases and projects.

**Obtaining data: questionnaires, secondary sources, microdata, unstructured data...**

**Cleaning and improving data: pre-processing, aggregation, enrichment...**

**Analyzing what the data tell us: basic univariate and bivariate descriptive statistics**

**Visualizing what the data says: graphs and visualization tools**

**Communicating what the data says: presentation, "story-telling" ...**

## TEACHING METHODOLOGY

### General methodological aspects of the subject

#### In-class Methodology: Activities

Development of case-projects by the teacher, with the collaboration of the students, by means of which the different concepts of descriptive statistics are different concepts of descriptive statistics, the use of the spreadsheet, visualization tools, and the procedures, sources and techniques for the of the spreadsheet, the visualization tools and the procedures, sources and techniques to obtain, clean and aggregate data.

CG2, CG3, CE01



Presentation of the projects developed by the students, following the structure of the ones developed by the teacher

### Non-Presential Methodology: Activities

Preparation and realization of practical cases in which we will try to replicate the structure and contents of the ones done by the teacher in the lectures

Individual study

CG2, CG3, CE01

### SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS		
Lecciones de carácter expositivo	Ejercicios y resolución de casos y de problemas	Exposición pública de temas o trabajos
25.00	25.00	10.00
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
40.00	20.00	30.00
<b>ECTS CREDITS: 6,0 (150,00 hours)</b>		

### EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
Final exam with multiple-choice theoretical-practical questions (35%) Final deliverables of the group project (20%)	Numerical rating from 0 to 10 According to rubric for evaluating LG 5 30% proposal 70% final presentation	55
Periodic continuous evaluation activities	Numerical rating from 0 to 10	10
Individual work and cases	To be performed at home Grade A, B, C, D	15



Class presentation of group work	According to rubric for evaluating Learning Goal #5	20
Co-assessment of group work		

## Ratings

It is necessary to obtain a 5 in the final exam to pass the course in any of the calls.

The final group work must be done with a minimum of quality in order to pass the course, both in the ordinary and extraordinary exams, as well as in the extraordinary exam. In a subject of an applied nature, it is necessary to demonstrate that you have acquired the skills to apply theoretical concepts to real data through the use of appropriate analysis techniques. The teacher may ask oral questions to the student in order to obtain evidence of his real participation in the elaboration of the work.

In the third and subsequent calls, it is recommended to do the work again, although it is not compulsory. The final grade in this case will be the better of the following two grades: a) 70% exam and 30% paper and b) 100% exam.

Exchange students (IN): same regime as regular students.

Exchange students (OUT): same system as for third and subsequent calls.

The use of ChatGPT or other generative IA models is welcome in the course as a 'co-pilot' to raise examples, solve doubts, improve and organize writing, among other aspects. Always under the student's responsibility since ChatGPT can provide false results.

Its use in face-to-face evaluation activities (final exam, tests, exposition and oral defense of the work) is expressly forbidden.

## WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Final project proposal		towards the middle of the course
Final project presentation	last course sessions	
Multiple-choice tests	at the ending of a thematic block	

## BIBLIOGRAPHY AND RESOURCES

### Basic Bibliography

Moodle

### Complementary Bibliography



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For statistical concepts

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

For visualization

Wilke, C.O. *Fundamentals of data visualization*.

<https://clauswilke.com/dataviz/index.html>

For story telling

[https://www.youtube.com/watch?v=V\\_YA761LPsE](https://www.youtube.com/watch?v=V_YA761LPsE)