



## TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Data Visualization
Subject code	DTC-BA-316
Main program	<a href="#">Grado en Análisis de Negocios/Business Analytics</a>
Involved programs	Grado en Análisis de Negocios/Business Analytics y Grado en Relaciones Internacionales [Second year] Grado en Análisis de Negocios/Business Analytics y Grado en Derecho [Third year] Grado en Administración y Dirección de Empresas y Grado en Análisis de Negocios/Business Analytics [Second year] Grado en Ingeniería en Tecnologías de Telecom. y Grado en Análisis de Negocios/Business Analytics [Third year]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	3,0 ECTS
Type	Compulsory
Department	Department of Telematics and Computer Sciences
Coordinator	Luis Francisco Sánchez Merchante
Office hours	To be arranged with the teacher

Teacher Information	
<b>Teacher</b>	
Name	Luis Francisco Sánchez Merchante
Department	Department of Telematics and Computer Sciences
E-Mail	lfsanchez@comillas.edu
<b>Teacher</b>	
Name	Diego Mallada Conte
Department	Department of Telematics and Computer Sciences
E-Mail	dmallada@icai.comillas.edu
<b>Teacher</b>	
Name	Ángel Ramos Valle
Department	Department of Industrial Organization
E-Mail	anramos@comillas.edu
<b>Teacher</b>	
Name	Carlos Miguel Vallez Fernández
Department	Department of Telematics and Computer Sciences
E-Mail	cmvallez@icai.comillas.edu

## SPECIFIC DATA OF THE SUBJECT

### Contextualization of the subject

#### Contribution to the professional profile of the degree

The recent update of the business paradigm to data-centric business models has favoured the rise of different visualisation techniques. Not only those that provide data exploration or data explanation capabilities but particularly those that allow the creation of dashboards. These new dashboards make it possible to replace traditional reports that are fundamentally centred on statistics and data tables with visualisations that are much quicker to interpret, in some cases interactive and with the capacity to be updated in real-time. These new technologies include mechanisms that allow permanent monitoring of these dashboards from any mobile device. The recent boom in visualisation and data-based storytelling represents a clear improvement in the way in which results were traditionally communicated to the executive positions of a company, offering the possibility of making decisions with a greater amount of actionable and up-to-date information.

The aim of the course is to familiarise students with the theory of visualisation and, in particular, with the generation of statistical graphs that favour the exploratory analysis of data. Many of the techniques and tools taught in the course are used in industry as a graphical synthesis tool for large data sets.

The course is structured in three sections. In the first section, the student will understand how the brain processes different visual stimuli and how this can be exploited to increase the effectiveness of a visualisation; in this same block, the student will also become familiar with concepts about grammar and semantics as well as being confronted with numerous use cases. In the second section, the student will be introduced to the tools currently used in the industry, mainly divided into dashboard building applications and visualisation libraries using programming languages. Both the dashboard building frameworks and the more programmatic tools are perfectly valid mechanisms for the statistical representation of data and for carrying out exploratory data analysis. The last section will present students with various practical challenges that they will have to solve throughout the course, culminating in a personal visualisation proposal for a set of data chosen by mutual agreement between the teacher and the student, selecting the technological solution that best suits the use case from among the many possibilities discussed during the course.

At the end of the course, students should be able to differentiate between the different visualisation technologies and have the necessary criteria to choose between them, as well as have acquired the ability to design and build visualisations that allow them to transmit a story based on data in the most efficient way possible.

#### Prerequisites

Basic knowledge of R and Python

### Competencies - Objectives

#### Competences

## THEMATIC BLOCKS AND CONTENTS

### Contents - Thematic Blocks

Theme 1: Introduction

- Perception and cognition
- Visualisation or infographics

- Exploration or explanation
- Purposes of visualisation
- Graphic excellence
- Bibliography

Theme 2: Visualisation basics

- Same facts, different stories
- Grammar of graphs
- Graphics semantics
- Types of graphs
- Enhancing a graph
- Multidimensional visualisations
- Design tools and environments
- Success stories

Theme 3: Programmatic visualisation

Using programming languages such as R, Python,...

- Statistical visualisations
- Construction of dashboards
- Exploratory analysis and visualisation

Theme 4: Commercial visualisation environments

- Building dashboards with multipurpose tools such as Tableau, PowerBI, Qlick,...

Theme 5: Real-time metrics visualisation tools

- Trends in tools for building monitoring dashboards

## TEACHING METHODOLOGY

### General methodological aspects of the subject

## SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS	
Lecciones de Carácter expositivo	Ejercicios y resolución de casos y de problemas
15.00	17.00
NON-PRESENTIAL HOURS	



Estudios individual y/o en grupo, y lectura organizada	Trabajos monográficos y de investigación, individuales o colectivos
29.00	29.00
<b>ECTS CREDITS: 3,0 (90,00 hours)</b>	

## EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
Practical exams at the end of multi-purpose and programmatic tools.	Evaluate graphical excellence and commitment of the requirements	55 %
Group work	Evaluate compliance with the proposed practice	15 %
Individual evaluation of theoretical/practical knowledge of each tool	Choosing the correct answer in a quiz	30 %

## Ratings

The grade in the ordinary call of the subject will be obtained as follows:

- 55% will be the grade of the practical exams on the tools.
- 30% will be the qualification of short exams of mainly theoretical content.
- 15% will be the grade for practical work in groups.

The grade in the extraordinary call:

- 20% will be an individual practical exam on a tool chosen by the lecturer.
- 40% will be a theoretical/practical test on the tools and fundamentals of visualisation seen during the course.
- 40% evaluation of work and student participation through the grading of exams and practical work carried out during the course.

In order to pass the course, students must have at least 5 points out of 10 in the final exam block in the ordinary exam session and in the sum of the individual practical exam and multiple-choice exam blocks in the extraordinary exam session.

## BIBLIOGRAPHY AND RESOURCES

### Basic Bibliography

It's provided together with the documentation in each thematic block.

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>