TECHNICAL SHEET OF THE SUBJECT

Data of the subject

Subject name	Data Visualization
Subject code	DTC-BA-316
Mainprogram	Grado en Análisis de Negocios/Business Analytics
Involved programs	Grado en Análisis de Negocios/Business Analytics y Grado en Relaciones Internacionales [Second year] Grado en Análisis de Negocios/Bachelor in Business Analytics y Grado en Derecho [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 Admin. y Dirección de Emp. y Grado en Análisis de Negocios/Bachelor in 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	Obligatoria (Grado)
Department	Department of Telematics and Computer Sciencies
Coordinator	Luis Francisco Sánchez Merchante
Office hours	To be arranged with the teacher

Teacher Information

Teacher

Name	Luis Francisco Sánchez Merchante
Department	Department of Telematics and Computer Sciencies
EMail	lfsanchez@comillas.edu

Teacher

Name	Iñigo Asensio Rey
Department	Department of Telematics and Computer Sciencies
EMail	iasensio@icai.comillas.edu

Teacher

Name	Adriana Carla Molero Alonso
Department	Department of Telematics and Computer Sciencies
EMail	acmolero@icai.comillas.edu

Teacher

Name	Gabriel Javier Maestroarena Rodas
Department	Department of Telematics and Computer Sciencies

EMail	gjmaestroarena@icai.comillas.edu

Teacher	
Name	Ignacio Reyes Arboledas
EMail	ireyes@icai.comillas.edu

Teacher	
Name	Luis Ignacio Gómez-Jordana Martín
EMail	ligomezjordana@icai.comillas.edu

Teacher	
Name	Luis Torres Serrano
EMail	ltserrano@icai.comillas.edu

Teacher	
Name	Ángel Ramos Valle
Department	Department of Industrial Organization
EMail	anramos@ext.comillas.edu

Teacher	
Name	Javier Poole Pérez-Palencia
Department	Department of Telematics and Computer Sciencies
EMail	jpoole@icai.comillas.edu

Teacher	
Name	María Javierre Moragues
EMail	mjavierre@icai.comillas.edu

Teacher	
Name	Víctor Miguel Sempere Navarro
Department	Department of Telematics and Computer Sciencies
EMail	vmsempere@icai.comillas.edu

Teacher	
Name	Manuel Eusebio de Paz Carmona
Department	Department of Telematics and Computer Sciencies
EMail	medepaz@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
	ECTS CREDITS: 3,0 (90,00 hours)

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.