



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

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CIHS

Syllabus
2024 - 2025

GENERAL INFORMATION

Data of the subject	
Subject name	Data Visualization
Subject code	DTC-MBD-516
Main program	Master in Big Data Technologies and Advanced Analytics
Involved programs	Máster Universitario en Ingeniería de Telecomunicación + Máster Big Data.Tecnología y Anal. Avanzada [Second year] Máster en Big Data. Tec. y Analítica Avanzada/Master in Big Data Technologies and Advanced Analytics [First year]
Level	Master
Quarter	Semestral
Credits	3,0 ECTS
Type	Optativa
Department	Department of Telematics and Computer Sciences
Coordinator	Manuel Eusebio de Paz Carmona
Office hours	To be agreed with subject teachers upon request by email.
Course overview	Questions and tutorials will be held after classes or during the following hours: Mon-Thurs 18-21 by appointment by email.

Teacher Information	
Teacher	
Name	Manuel Eusebio de Paz Carmona
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Profesores de laboratorio	
Teacher	
Name	Carlos Miguel Vallez Fernández
Department	Department of Telematics and Computer Sciences
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DESCRIPTION OF THE SUBJECT

Contextualization of the subject
Prerequisites
Basic knowledge of Python programming, handling of virtual environments and management of libraries and development packages. Optionally, Conda can also be used as a programming context for Python.



Course contents

Contents

Brief description of the contents of the subject:

Topic 1: Introduction to visualisation

- Perception and cognition
- 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

Topic 3: Programmatic visualisation

Through the use of different programming languages and/or frameworks, the following aspects are covered:

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

Topic 4: Business tools

- Building dashboards with multipurpose tools according to trends (e.g. Tableau, PowerBI, Qlick,...)
- Multipurpose tools in SaaS mode

Topic 5: Visualisation of real-time metrics

- Introduction to real time and comparison with batch
- Trends in tools for building monitoring dashboards

EVALUATION AND CRITERIA



Grading

Reference

Evaluation System	Minimum weighting	Maximum weighting
Written/oral exam/test	50	80
Evaluation of practical laboratory work and practical sessions with the use of software	10	30
Individual/group work/project/case study	10	20
Master's final project	N/A	N/A
Defence of the Master's Final Project	N/A	N/A

Implementation

- **Final Exam: 70%**
 - Theory: 20%
 - Practice: 50%
- **Evaluation of individual work: 20%**
 - Classwork
- **Practical group evaluation of the tools: 10%**
 - Group work

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

- 70% will be the grade of the theoretical and practical examinations on the tools.
- 20% will be the grade for practical work in groups.
- 10% will be the grade for exams/activities carried out in the classroom.

The grade in the extraordinary exam:

- 70% will be a theoretical/practical exam on the tools and fundamentals of visualisation seen during the course.
- 20% will be the grade for the practical group work that has been handed in.
- 10% will be the grade for exams/activities carried out in the classroom.

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 and in the individual practical exam in the extraordinary exam.



WORK PLAN AND SCHEDULE

Activities	Date of realization	Delivery date
Reading and study of theoretical content	After each class	
Resolution of the proposed problems or discussions and preparation of the proposed practices.	After each tool block	Until the finishing of the next block
Preparation of the quizzes	During all the semester	

BIBLIOGRAPHY AND RESOURCES

Basic References

Visualisation Theory:

- The Grammar of Graphics. Wilkinson, Leland. 2005
- The Visual Display of Quantitative Information. Edward Tufte. 1983

Programmatic Tools:

- Matplotlib for Python Developers. Sandro Tosi. 2009

Multipurpose tools:

- Practical Tableau. Ryan Sleeper. 2018
- Microsoft Power BI Complete Reference. Manuel Quintana. 2018

Real-time tools:

- Kibana Essentials. Yuvraj Gupta. 2015

Complementary References

Other complementary bibliography of special interest:

- Telling stories with data. Cole Nussbaumer Knaflic. 2015
- R Graphics Cookbook. Winston Chang. 2018



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