



COMILLAS

UNIVERSIDAD PONTIFICIA

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Syllabus
2025 - 2026

GENERAL INFORMATION

Data of the subject

Subject name	Unstructured Data Analysis
Subject code	DTC-MBD-522
Main program	Master in Big Data Technologies and Advanced Analytics
Credits	6,0 ECTS
Type	Obligatoria
Department	Department of Telematics and Computer Sciences

Teacher Information

Teacher

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DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Course contents

Contents

LOGS

Intro to Data Logs Analysis

Acquiring Data Logs

Pre-processing Data Logs

IMAGE



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Intro to Computer Vision

Basic Image Processing

Handcrafted feature extraction and Machine Learning

Deep Learning (CNNs, Data augmentation, Transfer learning)

Transfer learning (Feature extraction and Fine tuning)

Advanced Deep Learning: Feature maps Visualization

Generative Deep Learning, Stable diffusion models

AUDIO

Intro to Sound Data

Audio Data Pre-processing (Sound properties, Audio data characteristics, etc.)

Feature Extraction (MFCCs, Spectrograms, etc.)

Data Exploration and Audio Visualization (Clustering, etc.)

Deep Learning with Audio data

Generative Deep Learning, Speech-to-Text, Text-to-Audio

TEXT

Intro to Natural Language Processing (tokenization, lemmatization, POS, NER, etc.)

Feature extraction. One hot encoding. Document representation

Dimensionality Reduction. Words Embeddings. Machine Learning with NLP

Deep Learning applied to sequence data (RNN, LSTM, etc.)

Generative Deep Learning, Transformers, GPT, Reinforcement Learning

GRAPHS

Intro to Network Analysis and Graph theory

EVALUATION AND CRITERIA



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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.

Grading

Assessment Activities Criteria Weight

Realization of exams: Tests

- At the end of each topic
- Final Exam
 - Understanding of concepts.
 - Application of concepts to the resolution of practical problems.
 - Presentation and structure.

Weight: 40%

Laboratory practices

- Understanding of concepts.
- Application of concepts to the resolution of practical problems.
- Presentation and structure.
- Laboratory Practices Report

Weight: 60%

BIBLIOGRAPHY AND RESOURCES

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<https://servicios.upcomillas.es/sedelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792>