



GENERAL INFORMATION

Data of the subject	
Subject name	Architecture of Network Services
Subject code	DTC-MIT-515
Main program	Official Master's Degree in Telecommunications Engineering
Involved programs	Máster Universitario en Ingeniería de Telecomunicación [First year] Máster Universitario en Ingeniería de Telecomunicación y Máster en Ciberseguridad [First year] Máster Universitario en Ingeniería de Telecomunicación + Máster in Smart Grids [First year]
Credits	6,0 ECTS
Type	Obligatoria
Department	Department of Telematics and Computer Sciences
Coordinator	Agustín Gómez & Lucas Álvarez

Teacher Information	
Teacher	
Name	Agustín Fernando Gómez Lamela
Department	Department of Telematics and Computer Sciences
E-Mail	afgomez@icai.comillas.edu
Teacher	
Name	Guillermo Muñoz Salgado
Department	Department of Telematics and Computer Sciences
E-Mail	gmunoz@icai.comillas.edu
Teacher	
Name	Miguel Ángel Barrera Ruano
Department	Department of Telematics and Computer Sciences
E-Mail	mabarrera@icai.comillas.edu

DESCRIPTION OF THE SUBJECT

Contextualization of the subject

Course contents

Contents
Topic 1: Introduction to the network, computing and storage technologies of a Data Center. 1.1. General infrastructure of a Data Center. 1.2. Computing and storage services. 1.3. Availability and certifications.



Topic 2: Virtualization

- 2.1. Virtualization platforms and techniques.
- 2.2. Virtual machines.
- 2.3. Infrastructure as code. Ansible and Terraform
- 2.4. containers.
- 2.5. Container orchestration. Kubernetes.

Topic 3: Cloud Computing

- 3.1. From virtualization to the Cloud.
- 3.2. Cloud types.
- 3.3. platforms.
- 3.4. Administration and operation of a Cloud platform:
 - Management and monitoring tools.
 - Availability.
 - Elasticity and availability.
 - Services.
- 3.5. Design and deployment of native Cloud applications.
 - Storage, Databases and Network.
 - DevOps.
 - Architecture based on microservices.
- 3.6. Cloud programmatic management.
- 3.7. Cloud cost estimation. Migration.

Topic 4: Big Data Architecture

- 4.1. Hardware and software infrastructure:
 - Introduction to mass storage and processing systems.
- 4.2. Tools:

Tools and libraries of the Hadoop ecosystem.

HDFS file system.

Bulk Processing: MapReduce, YARN, and Spark.

Kafka messaging system.

noSQL databases

- 4.3. Deployment:
 - Deployment of Stacks with the use of a container orchestration tool.
 - Sizing of a cluster.
 - Big Data in the Cloud.

EVALUATION AND CRITERIA

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.



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

Syllabus 2026 - 2027

Evaluation activities	Evaluation criteria	Weight
exams Individual exams or tests, made in classroom.	Mid-term test. will be evaluated assimilation of theoretical concepts and practical on the subject of Virtualization: 15%. Final exam. understanding of concepts through open tests on architecture design and use of case-focused tools/techniques practical: 50%	65
Continuous performance evaluation: Individual or group practical work cluster. Projects developed by students. Exercises or problems solved in a way individually or in a group. Active participation in class.	Testing and work individual work done in class: 30%	30
Evaluation of the experimental work: Active participation in the laboratory. Raising doubts outside the content seen in class.	Have completed the practices correctly in time and form to be considered	5

Grading

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

50% of the final exam grade.

15% of the qualification of the intersemester test.

30% will be the qualification of the laboratory practices.

5% will be the qualification of the continuous evaluation.

The qualification in the extraordinary call:

50% of the final exam grade.

15% of the qualification of the intersemester test.

30% will be the qualification of the laboratory practices.

5% will be the qualification of the continuous evaluation.

To pass the subject, students must have at least 5 points out of 10 in the final exam and in the final practice of the course.

subject both in the ordinary and in the extraordinary call.

BIBLIOGRAPHY AND RESOURCES

In compliance with current regulations on the **protection of personal data**, we would like to inform you that you may consult the



COMILLAS

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

Syllabus 2026 - 2027

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/sedeelectronica/inicio.aspx?csv=02E4557CAA66F4A81663AD10CED66792>