

## SUBJECT TEACHING GUIDE

### 331 - Technologies for Datacenters

#### Master's Degree in computing engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Master's Degree in computing engineering			Type and Year	Compulsory. Year 1
Faculty	Faculty of Sciences				
Discipline	COMPUTER ENGINEERING				
Course unit title and code	331 - Technologies for Datacenters				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA				
Name of lecturer	ENRIQUE VALLEJO GUTIERREZ				
E-mail	enrique.vallejo@unican.es				
Office	Facultad de Ciencias. Planta: + 1. DESPACHO (1098)				
Other lecturers	ALVARO LOPEZ GARCIA BORJA PEREZ PAVON				

3.1 LEARNING OUTCOMES
- To know and apply the design principles used on computer architecture, operating systems and computer networks
- Be able to analyze, evaluate and compare different computer architectures and computer networks for datacenters
- Be able to deal with new architectures and systems
- To know how to design and dimension the essential components of a datacenter architecture taking into account cost, energy and performance factors.

**4. OBJECTIVES**

The main goal is that the student acquires a global understanding of the technological solutions for deploying a modern datacenter. The acquired knowledge will be applied to enterprise, BigData and HPC datacenters.

**6. SUBJECT PROGRAM**

**CONTENTS**

1	Introduction to Datacenter Technologies. Basic concepts; definition and types of datacenters; Servers, storage and networking; Power and cooling; Availability and redundancy. Cloud services and externalization.
2	Datacenter infrastructures. Power and cooling. Energy efficiency metrics. Datacenter availability and security aspects. Green guidelines in the Datacenter. Power consumption of the DC and carbon footprint.
3	Storage systems for datacenters
4	Datacenter networks
5	Servers for datacenters
6	Infrastructure Software in datacenters. Introduction to Cloud Computing. Service models, advantages and disadvantages. Study of OpenStack: modules and functionality.

**7. ASSESSMENT METHODS AND CRITERIA**

Description	Type	Final Eval.	Reassessn	%
The proposed technical work will be focus on modern datacenter technologies. Formal written informs and public expositions will be required.	Work	No	Yes	40,00
It will be composed of a written exam together with the evaluation of the proposed technical work.	Written exam	No	Yes	60,00
<b>TOTAL</b>				<b>100,00</b>
Observations				
Observations for part-time students				
Part-time students will follow the same procedure for examination. Nevertheless, the assigned technical work should be more elaborated and can entail up to 75% of the final mark.				

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

**BASIC**

The Datacenter as a Computer: An Introduction to the Design of Warehouse-Scale Machines (Third Edition)  
L.A. Barroso, U. Hözl & P. Ranganathan.  
Morgan & Claypool Pub. Synthesis Lectures on Computer, 2018.

CCNP and CCIE Data Center Core DCCOR 350-601 Official Cert Guide.  
S. Maloo, F. Ahmed.  
Cisco Press, 2020.

Data-Center virtualization fundamentals.  
G. Santana.  
Cisco Press, 2013.

