

SUBJECT TEACHING GUIDE

331 - Technologies for Datacenters

Master's Degree in computing engineering

Academic year 2023-2024

| 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. COURSE ORGANIZATION

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 | Servers for datacenters |
| 3 | Storage systems for datacenters |
| 4 | Datacenter networks |
| 5 | Infrastructure Software in datacenters. Introduction to Cloud Computing. Service models, advantages and disadvantages. Study of OpenStack: modules and functionality. |
| 6 | 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. |

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 |
| TOTAL | | | | 100,00 |
| Observations | | | | |
| Observations for part-time students | | | | |
| The students in such a situation 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. Hölzle & 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.

