

SUBJECT TEACHING GUIDE

M1690 - Technologies for Datacenters

Master's Degree in computing engineering

Academic year 2020-2021

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	M1690 - 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				
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Other lecturers	FERNANDO VALLEJO ALONSO ALVARO LOPEZ GARCIA				

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	Networks for datacenters
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	50,00
It will be composed of a written exam together with the evaluation of the proposed technical work.	Written exam	No	Yes	50,00
TOTAL				100,00
Observations				
There is just one yearly evaluation. If the student cannot pass the subject through the ordinary activities, there will be an extraordinary opportunity in the extraordinary period.				
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 (Second Edition)

L.A. Barroso, J. Clidaras & U. Hölzle

Morgan & Claypool Pub. Synthesis Lectures on Computer (2013)

Data-Center virtualization fundamentals

G. Santana

Cisco Press, 2013.

