SUBJECT TEACHING GUIDE

G676 - Multiprocessors

Degree in Computer Systems Engineering

Academic year 2018-2019

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Optional. Year 4
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computer Engineering Mention in computer Engingeering				
Course unit title and code	G676 - Multiprocessors				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
Name of lecturer	JULIO RAMON BEIVIDE PALACIO
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Other lecturers	RAFAEL MENENDEZ DE LLANO ROZAS BORJA PEREZ PAVON

3.1 LEARNING OUTCOMES
- To know the basic principles of parallelism and its applications to different computing levels
- To know the basic models of parallel programming: shared memory and message passing
- To know the basic models of parallel architectures: SIMD, MIMD, SMP, CC-NUMA & NUMA
- To know typical node (server) implementations: GPUs & CMPs
- To know the design trends on servers, datacenters, cloud computing and supercomputers
- To know the fundations of interconnection networks for parallel systems
- To know the fundations of message passing with emphasis on MPI

4. OBJECTIVES

The goal is that the student knows the foundations of modern computers, especially those exploiting high levels of parallelism. Emphasis will be put on big severs and systems entailing thousands of cores. The main applications will be oriented to datacenters, clouds and supercomputers.

6. COURSE ORGANIZATION

CONTENTS	
1	Introduction to Multiprocessors
2	Large-scale multiprocessors: HPC, datacenters and clouds. Programming with MPI
3	Basics of interconnection networks for parallel systems
4	Thread-level parallelism. Coherency, synchronization and consistency. Snooping and directories.
5	Data-level parallelism: SIMD & GPUs
6	Final evaluation

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Technical work focused on programming GPUs and multiprocessors	Laboratory evaluation	No	Yes	50,00
It will consist of a written exam including all the topics managed on the subject.	Written exam	Yes	Yes	30,00
Technical work focused on current results on modern parallel computers and technologies. Formal written informs and public expositions will be required.	Oral Exam	Yes	Yes	20,00
TOTAL				100,00

Observations

The final mark will be obtained from the average of the three evaluated parts: laboratory duties, written exam and technical work. It is compulsory to obtain at least 3,5 points over 10 on each part for passing the subject.

Observations for part-time students

The students on this situation will take the written exam together with a technical work that can entail 70% of the final mark. It is compulsory to obtain at least 3,5 points over 10 on each part for passing the subject.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Computer Architecture
J.L. Hennessy and D.A. Patterson
Ed. Morgan Kaufmann 2012

Principles and Practices of Interconnection Networks
W.J. Dally and B. Towles
Ed. Morgan Kaufmann 2004