# Computing architectures design and evaluation

**Academic Year: ( 2020 / 2021 )** **Review date: 31/12/2020 08:28:20**

**Department assigned to the subject:**

**Coordinating teacher: CARRETERO PEREZ, JESUS**

**Type: Compulsory ECTS Credits : 6.0**

**Year : 1 Semester : 2**

## OBJECTIVES

Specific competences of the subject:
1. Ability to design and evaluating servers and their operating systems
2. Ability to design and evaluating distributed systems
3. Ability to design and evaluating systems, applications, and services for embedded systems.
4. Ability to understand and to apply the organization and behaviour of middleware and component -based models.
5. Ability to design and developing systems, applications, and services for ubiquitous systems.
6. Ability to design distributed, ubiquitous, and real-time systems.

Learning results:

The student will be able of:
¿ Designing operating systems, distributed systems, embedded systems, and ubiquituous systems.
¿ Evaluating operating systems, and distributed computing systems.
¿ Developing systems, applications, and services in embedded and ubiquituous systems..
¿ Understanding and using middleware software and component-based models.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction:
   - Computer Systems
   - Performance Metrics
2. Design of System Architectures
   - Virtualization
   - Centralized and distributed systems
   - Techniques for scalability
   - Grid and Cloud Computing
3. Performance Evaluation System
   - Modeling quantitative methods
   - Performance Engineering Methodology
   -Queuing models as performance modeling
   - Advanced Settings for queuing models
4. Data Center Design issues
   - Components of a Data center
   - Presentation of practical CPD case
   - Evaluation of costs

## LEARNING ACTIVITIES AND METHODOLOGY

- Theory classes.
o Oriented towards specific competences of the subject, they will allow to teach the students the concepts they should know. Before the classes, the students will have in advance course materials and

bibligraphy to study and to deeply understand the course topics. Moreover, students will also have access to technical documentation for servers, distributed and embedded systems, and middleware.

- Projects.
  - The course includes mandatory projects, that will be made in groups. Projects will include work to install and evaluate computational architectures (distributed, embedded, fault-tolerant, ...).
- Tutorized academic activities.
  - Solving exercises or studying practical use cases with the teacher in class. Distributed or real-time systems designs will be disscussed.
- Student self-study
  - Specially oriented to acquire autorganization capacities and to be able to plan individual work and the learning process. It might include exercises, extra lectures, and studying the course contents.

## ASSESSMENT SYSTEM

| | |
|---|---|
| **% end-of-term-examination/test:** | 20 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 80 |

The mission of the course evaluation is to assest the level of coverage of the learning objectives, thus, it will take into account all the student work, individually or in group, by making continuous evaluation of the student activities by using exercises, exams, projects, and other academic activities described before.

The final student score will include the evaluation of all the student activities, individually or in group.

Projects evaluation will be 60% of the total score. They are mandatory. A minimum average score of 40% is needed.

A final comprehensive ordinary exam will provide the remainder 40% of the score. A minimum score of 35% is required to pass the exam and to take into account the continuous evaluation.

For the ordinary exam, if the student did not follow continuous evaluation, final score will be 60% of the exam score, which means that a 8,33 over 10 is needed to pass the course.

For the extraordinary exam, the value will be 40% of the score for those students following continuous evaluation. A minium score of 35% is required to pass the exam and to take into account the continous evaluation.

University rules applies to ordinary and extraordinary evaluation.

## BASIC BIBLIOGRAPHY


- G. Coulouris, J. Dollimore, T. Kindberg Sistemas distribuidos. Conceptos y diseño. Tercera edición, Addison-Wesley, 2001.

- Daniel A. Menascé, Virgilio A. F. Almeida, Lawrence W. Dowdy, Larry Dowdy Performance by Design: Computer Capacity Planning By Example, Prentice Hall, 2004

- Neil J. Gunther The practical performance analyst , Choice Press, 2000

- Saltzer & Kaaashoek Principles of Computer Systems Design. An Introduction., Morgan Kauffman. 2009..