

## SUBJECT TEACHING GUIDE

### G660 - Operative Systems

#### Degree in Computer Systems Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Compulsory. Year 2
Faculty	Faculty of Sciences				
Discipline	Subject Area: Computer Systems and Networks Compulsory Module				
Course unit title and code	G660 - Operative Systems				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web	<a href="https://moodle.unican.es/">https://moodle.unican.es/</a>				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA				
Name of lecturer	RAFAEL MENENDEZ DE LLANO ROZAS				
E-mail	rafael.menendez@unican.es				
Office	Facultad de Ciencias. Planta: + 1. DESPACHO PROFESOR (1097)				
Other lecturers	JOSE MIGUEL PRELLEZO GUTIERREZ				

### 3.1 LEARNING OUTCOMES

- The student will be able to understand and use operating systems, both at the user level and at the programmer level using the POSIX services of the same.

Specifically:

- They will become an advanced user of the operating system and will therefore use its command interpreter (bash) professionally.
- They will be able to make system calls (POSIX) to request different services.
- They will understand how the operating system creates, manages, and schedules processes (heavy or light) and the types of light processes that exist.
- They will program concurrent applications, using techniques for the creation, synchronization, and communication of processes (and threads).
- They will understand how the operating system manages the system's physical memory, input/output, and storage devices, including their scheduling.
- They will know how the operating system abstracts the use of storage systems and uses them to support physical memory.
- They will program applications that can make system calls for the use of the storage system and input/output devices.

### 4. OBJECTIVES

This course focuses on the basic knowledge of the operating system (hardware abstraction) and the programming resources it offers. Therefore, it is expected that the student will:

Know how an operating system is constructed and how to use it at an intermediate/advanced user level.

Understand how to use the CPU by creating, managing, and scheduling processes, both heavy and light, and their differences.

Know how to create concurrent applications with different processes that synchronize and communicate with each other .

Understand how input/output devices are abstracted by the system.

Master how the system uses and manages physical memory with different methods .

Understand how storage devices are abstracted, their management, scheduling, and use as support for physical memory (secondary memory), constituting virtual memory.

Know how to create applications that use system calls and language libraries to use storage devices and concurrent programming.

6. SUBJECT PROGRAM	
CONTENTS	
1	Introduction to the Operating System: Concept of Operating System. Hardware and its Treatment. Functional vision of the operating system. Evolution and components.
2	Shell
3	ANSI C development environment
4	Process management.
5	Scheduling
6	Threads management
7	POSIX Process
8	Block one Evaluation
9	Concurrent Programming
10	Signals
11	Pipes
12	Virtual Memory management.
13	Block two Evaluation
15	POSIX Threads
15	Memory management. Pagination and Segmentation
16	Mutex and condition variables
17	File Systems and Hard Disks management.
18	Making a concurrent program with threads
19	Theoretical problems
20	Evaluation of practical Block 3
21	File Systems and Hard Disks management.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Make a computer program for each part in the computer laboratory. 40%	Laboratory evaluation	No	Yes	40,00
Take a written test of short or test questions and problems.	Written exam	No	Yes	40,00
Theory: Continuous assessment with Moodle quizzes (10%).	Activity evaluation with Virtual Media	No	No	10,00
* Practicals Continuous assessment will be conducted via Moodle tests (10%).	Activity evaluation with Virtual Media	No	No	10,00
TOTAL				100,00
Observations				
<p>Theory:</p> <p>The theory component is assessed through two written exams consisting of short questions and problems (40%) and continuous assessment with Moodle quizzes (10%). The minimum score required to combine with practicals is 4. There will be a midterm theory exam that can exempt students from certain material. The remaining material will be covered in the regular exam session, during which students can retake the midterm. Problems will be evaluated in written form during the assessment tests. In the extraordinary session, a comprehensive exam covering all the material will be administered</p> <p>Practicals</p> <p>The minimum grade required to offset with the theory will be 4. Evaluation will be carried out through two partial exams in the laboratory, which are eliminatory (40%). Continuous assessment will be conducted via Moodle tests (10%). This part can be recovered during the regular examination period. A comprehensive exam of the material will be conducted during the extraordinary laboratory session .</p>				
Observations for part-time students				
Part-time students will have the option to achieve 100% of the grade with a final exam during both the regular and extraordinary periods.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

#### Parte teórica:

-Silberschatz, "Operating systems", 10ª edición, Mc Graw Hill. O su versión en español.

#### Parte práctica:

-Guiones de los apuntes.