SUBJECT TEACHING GUIDE

G850 - Operative Systems

Degree in Telecommunication Technologies Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Telecommunication Technologies Engineering			Type and Year	Optional. Year 3
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Operating Systems				
Course unit title and code	G850 - Operative Systems				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web	https://aulavirtual.unican.es/				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
Name of lecturer	PABLO PRIETO TORRALBO
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Other lecturers	

3.1 LEARNING OUTCOMES

- Using an operating system as a user.
  Employing the operating system calls to build both single-threaded and multithreaded programs on different architectures with one or more processors.
  Understanding how the Operating System uses the hardware of the computer and makes it accessible to the user/programmer.

4. OBJECTIVES

Analysis of the main activities of the Operating System related to process scheduling and control, memory management and input-output control.
Understanding of the several utilities that provides an Operating System through system calls.
Knowledge of the Unix operating system (GNU-Linux), both from the user standpoint and from the application programmer standpoint.

6. COURSE ORGANIZATION

	CONTENTS
1	Introduction. Definition of Operating System. Evolution. Main components. Basic features of current operating systems.
1.1	Lab Environment, and general overview of the GNU-Linux operating system. The Shell. Using the Shell
1.2	Introduction to the C Programming Language in GNU-Linux
2	CPU Virtualization (Processes). Basic states of a process. Process Control Block (PCB). Context switch. Operations on processes. CPU scheduling. Algorithms.
2.1	Unix/Linux system calls. Process management API. Process control and visualization in Linux
3	Memory Virtualization. Requirements. Address Space. Address Translation. Memory partition. Paging. Segmentation. Programs not fitting into memory. Virtual memory
3.1	Memory API. Heap and Stack management. Using monitoring tools. Pointers in C.
4	Communication and Synchronization Interprocess Communication. Critical-section Problem. Software and hardware algorithms for mutual exclusion. Semaphores. Synchronization. Condition variables.
4.1	Threads. Definition. Creation. Execution.
5	Persistence. File system. Internal structure of the file system. Storage Devices.
5.1	File management API. Linux File System

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Evaluation of lab work	Laboratory evaluation	No	Yes	40,00
Testing each subject block	Written exam	No	Yes	30,00
Final tests	Written exam	Yes	Yes	30,00
TOTAL				100,00

Observations
There is an individual exam at the end of each lab work. Personal lab work must be submitted for evaluation before taking the exams. Students who pass the evaluation of each lab work will not have to take the lab portion of the final exam.

Observations for part-time students
Students that meet these conditions and do not take the exams during the course, will have to take a global exam, which includes both lab and lecture work. Personal lab work must be submitted for evaluation before taking the exam.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau "Operating Systems: Three Easy Pieces", ed Arpaci-Dusseau Books, August, 2018 (Version 1.0) (http://www.ostep.org)