

## SUBJECT TEACHING GUIDE

### G850 - Operative Systems

#### Degree in Telecommunication Technologies Engineering

Academic year 2019-2020

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			
Language of instruction	Spanish	English Friendly	No
		Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
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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 system calls. Process management API.
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.
4.1	Synchronization. Conditional variables. Signal Handling
4.2	Threads. Definition. Creation. Execution.
5	Filesystem. Internal structure of the file system. Storage Devices.
5.1	File management API.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Evaluation of lab work	Laboratory evaluation	No	Yes	35,00
Testing each subject block	Written exam	No	Yes	30,00
Final tests in February and September .	Written exam	Yes	Yes	35,00
<b>TOTAL</b>				<b>100,00</b>
<b>Observations</b>				
There is an individual exam at the end of each lab work. Personal work must be submitted for evaluation.				
<b>Observations for part-time students</b>				
There is an individual exam at the end of each lab work. It is possible to take just a lab final exam. Personal work must be submitted for evaluation.				

## 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>)