

## SUBJECT TEACHING GUIDE

### G850 - Operating Systems

#### Degree in Telecommunication Technologies Engineering

Academic year 2016-2017

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 - Operating Systems		
Number of ECTS credits allocated	6	Term	Semester based (2)
Web			
Language of instruction	Spanish	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA
Name of lecturer	PABLO PRIETO TORRALBO
E-mail	pablo.prieto@unican.es
Office	Facultad de Ciencias. Planta: + 1. DESPACHO PROFESOR (1106)
Other lecturers	SERGIO GARRIDO FERNANDEZ

### 3.1 LEARNING OUTCOMES

- Capacity for using an operating system as a user.  
Employing the operating system calls to build both single-threaded and multithreaded systems on different architectures with one or more processors.
- Ability to understand how the operating system uses the hardware of the computer and makes it accessible to the user/programmer.

#### 4. OBJECTIVES

The main objectives of the course are the analysis of the main activities of the operating system to process scheduling and control, memory management and input-output control. On the other hand, understanding of the several utilities that provides an operating system through system calls. Finally, knowledge of the Unix operating system (GNU-Linux), both from the standpoint of user and from the standpoint of application programmer.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Introduction. Definition of Operating System. Evolution. Main components. Basic features of current operating systems.
1.1	Overview of the GNU-Linux operating system
2	CPU Virtualization (Processes). Basic states of a process. Process Control Block (PCB). Context switch. Operations on processes. CPU scheduling. Algorithms.
2.1	The shell. Using the shell. Utilities. C programming language. Compilation. Execution. Tools. Unix system calls. Using the interface calls. Processes, files, pipes.
3	Memory Virtualization. Requirements. Address Space. Address Translation. Partition memory. Paging. Segmentation. Virtual memory
4	Communication and Synchronization Interprocess Communication. Critical-section Problem. Software and hardware algorithms for mutual exclusion. Semaphores.
4.1	Threads. Definition. Creation. Execution.
4.2	Synchronization. Conditional variables. Signal Handling
5	Filesystem. Internal structure of the file system. Storage Devices.

#### 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				
<b>Observations for part-time students</b>				
There is an individual exam at the end of each lab work				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau "Operating Systems: Three Easy Pieces", ed Arpaci-Dusseau Books, March, 2015 (Version 0.90) ([www.ostep.org](http://www.ostep.org))

A. Silberschatz, P. B. Galvin and G. Gagne "Operating System Concepts Essentials", ed John Wiley & Sons, Eight Edition, 2010