OPERATING SYSTEMS AND DISTRIBUTED SYSTEMS

Code: 322107

Main Scientific Area: Computer networks and architecture

Lecturer: Liliana Cristina de Barros Ribeiro da Cunha Pinheiro

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

Objectives

This curricular unit has as main objective to familiarize students with the concept of the Operating System, as well as its main functions, user interface and efficient resource manager.

In order to achieve this goal, will be studied the main components of an operating system and their interaction with hardware and application software.

For practical concepts demonstration, will be used the Linux operating system.

Learning Outcomes

Students who successfully complete this curricular unit should be able to:
Understand the operating system role as a middleware between hardware and software as a resource manager for correct operation of the machine;
Identify the main management functions of the operating system;
Understand and practice how to use the interfaces in text and graphic mode for the user; Install a new operating system on an empty machine;
Use a virtual machine to run a second OS;
Use an user interface to launch and monitor of processes;
Develop an application to handling files on the system.

Course Contents

Introduction to Operating Systems

OS Functionality, classification and organization;

Operating systems evolution;

OS installation process on a new machine;

Virtual Machines

Command line interface (CLI) and graphic user interface (GUI).

Process and Memory Management

Process definition;

Process scheduling;

Memory management techniques;

Virtual memory: segmentation and pagination;

File Management

File system organization and structure;

Authorization and Access control: file permissions;

System calls for files handling.

Inter-Process Communication

Creation of new processes

Memory sharing / message exchange

Pipes;

Sockets;

Distributed Systems

Introduction to the Distributed Systems

Transparency, concurrency, security, scalability and fault tolerance;

Communication architecture: Client-server model, inter process communication and remote procedure calls;

Distributed File System in Windows and Linux

Recommended Bibliography

Andrew S. Tanenbaum, Modern Operating Systems, Pearson Education, 2010.

Abraham Silberschatz, Operating System Concepts, John Wiley Sons, 2009.

J. Marques, Paulo Ferreira, Carlos Ribeiro, Luís Veiga, Rodrigo Rodrigues, Sistemas Operativos, FCA, 2009.

G. Coulouris, J. Dollimore, T. Kindberg, Distributed Systems: Concepts and Design, Fourth Edition, AddisonWesley, 2005.

Jorge Ganjal, Gestão de Sistemas e Redes em Linux, FCA, 2010

Learning and Teaching Methods

The syllabus contents of this curricular unit address the main concepts of Operating Systems area, as well as in the Distributed Systems area.

The concepts introduced in this discipline together with their practical application, allow students to understand in a

consolidated way the main characteristics of the systems functioning, so that they can be used more effectively, which are the main objectives of the curricular unit.

Assessment Methods

The methodology used to evaluate students will consist in several worksheets, one written test and a practical assignment, to be made during the lecture period.

If a student fails to approve during continuous assessment period, will be given an additional chance to recover (examinations period), the evaluation consists of the same assumptions as the continuous assessment period (considering the worksheets and the practical assignment carried out in the evaluation period).

In the special examination period, the written exam will have a weighting of 100% in final evaluation, not be considered any worksheets or practical assignment previously done.

The minimum grade as assessment condition is 7.5 values for all components. The minimum grade of approval to the discipline is 10 values on a scale of 0 to 20.