COMPUTER ARCHITECTURE AND OPERATING SYSTEMS

Code: 10305

Main Scientific Area: Computer Architecture, Distributed Systems and Cybersecurity

Lecturer: Nuno Alberto Ferreira Lopes

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 100h

ECTS: 6,0

Objectives

The aim of this course is to equip students with the basic knowledge related to computers' architecture, and familiarize them with operating system's main components and functions.

To achieve these objectives a historical computer and operating systems evolution will be presented, as well as, the way they are structured, the main functions and the various interactions between them.

Learning Outcomes

Identify the elements that composes a personal computer, and its main components;

Know a micro-controller's internal structure;

Understand the interaction between a processor, the memory, and its peripherals;

Perform performance measurement tests, in order to compare two different computers, and evaluate their

main metrics;

Relate multi-processor architectures regarding performance improvement;

Understand the operating system's role as a bridge between the hardware and the software to guarantee

the correct operation of the system;

Identify the main functions of an operating system - process management, memory and files;

Understand the multitasking paradigm and associated synchronism mechanisms;

Know how to use the text and graphical interfaces available in an operating system;

Install a new operating system and services in a virtual machine environment;

Use a virtual machine to run a new operating system

Course Contents

Introduction to Computer Architecture;

Introduction to Digital systems;

Microprocessors;

Components and buses;

Computer benchmarking;

Introduction to Operating Systems;

Process management and memory management;

File system management.

Recommended Bibliography

Jose Delgado e Carlos Ribeiro, "Arquitectura de Computadores", FCA, 2008 (2a edicao);
J. Marques, Paulo Ferreira, Carlos Ribeiro, Luis Veiga, Rodrigo Rodrigues, "Sistemas Operativos", FCA, 2009.

Learning and Teaching Methods

The contents of this course covers the computers' and operating systems' key architectural concepts, enabling the understanding of both hardware and software aspects that are part of a computer, allowing the use and problem solving related with computers, in a more efficient way, thus meeting the objectives established to this Curricular Unit.

Assessment Methods

Evaluation will consist of 2 tests and a group project.
The student's grade will be calculated from the written part - 60% (30% each test) and practical assignment grade (40%). There is a minimum grade for approval of 7 values for all components of the evaluation.
Only students with approval on practical project have access to the exam periods.

Students that participate in the 50-10 Project will have a component of 15% of their final score allocated for this project.