

SUBJECT TEACHING GUIDE

G267 - Introduction to Computers

Degree in Computer Systems Engineering

Academic year 2021-2022

| 1. IDENTIFYING DATA | | | | | |
|----------------------------------|---|------------------|--------------------|------------------|--------------|
| Degree | Degree in Computer Systems Engineering | | | Type and Year | Core. Year 1 |
| Faculty | Faculty of Sciences | | | | |
| Discipline | Subject Area: Fundamentals of Computer Science Basic Training Module | | | | |
| Course unit title and code | G267 - Introduction to Computers | | | | |
| Number of ECTS credits allocated | 6 | Term | Semester based (2) | | |
| Web | | | | | |
| Language of instruction | Spanish | English Friendly | No | Mode of delivery | Face-to-face |

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| Department | DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA |
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3.1 LEARNING OUTCOMES

- To know the basic principles of von Neumann architecture
- To understand the methods of representing and processing information in the computers at a low level , both numerical (integer and real) as alphanumeric.
- To know the basic principles that led to the development of the classical model of computer
- To know the main features of the functional units of the computer and its operating principles
- To understand how a computer works and the different phases of instruction execution
- To understand how data and instructions are represented in the computer memory
- To understand the relationship between the structure of the computer and the instruction set of low level
- To know the basics of assembly language and their addressing modes
- To know the correspondence that exists between the typical elements of high-level languages and assembly language
- To know the correspondence between assembly language and machine language
- To be able to design and implement algorithms and assembly language programs to manage types of numeric and alphanumeric data
- Use the low-level code style of programming.

4. OBJECTIVES

The main objective is to understand the basic principles of Computer Engineering. Students must understand how a modern computer works. They must program with some ease different algorithms and applications in assembly language and make a first analysis of the various functional units of a computer.

1. To understand computers, its functional blocks, machine language and assembly language.
2. To know data and instruction representation in the memory of a present-day computer.
3. To know the correspondence between the different levels of languages : high level, assembly and machine languages.
4. To design algorithms and programs involving functions using assembly language .

6. COURSE ORGANIZATION

| CONTENTS | |
|----------|--|
| 1 | Introduction to computer engineering. |
| 2 | Representation of the information in a computer. - Natural numbers, integers, floats. - Characters - Overflow |
| 3 | Architecture of ARM processor - Assembly language - Machine language - Compiling, assembling and loading |
| 4 | ARM Assembly programming |
| 5 | Modular assembly programming |
| 6 | Microarchitecture ARM processor - Performance analysis - Single-cycle datapath and control |

7. ASSESSMENT METHODS AND CRITERIA

| Description | Type | Final Eval. | Reassessn | % |
|--|--------------|-------------|-----------|--------|
| Exams and workshops. | Others | No | Yes | 50,00 |
| Exams along the semester | Written exam | No | Yes | 50,00 |
| TOTAL | | | | 100,00 |
| Observations | | | | |
| The califications obtained in the sections 'Evaluación teórico-práctica' and 'Evaluación laboratorio' can be repeated in july. | | | | |
| Observations for part-time students | | | | |
| Part-time students can choose between following the usual evaluation of the subject or doing a single exam. This must be communicated to the responsible of the course at the beginning of the semester. | | | | |

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Digital design and computer architecture. Sarah L. Harris, David Money Harris. Waltham, Massachusetts : Morgan Kaufmann, cop. 2016. ISBN: 978-0-12-800056-4

Modern assembly language programming with the ARM processor. Larry D. Pyeatt. Kidlington (UK) ; Cambridge (USA) : Newness/Elsevier, cop, 2016. ISBN: 978-0-12-803698-3