Course guide
340375 - ESC2-I3001 - Computer Structure II

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 701 - DAC - Department of Computer Architecture.

Degree: BACHELOR’S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2018). (Compulsory subject).
Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: Lopez Pastor, Eduardo Tommy
Others: Heredero Lazaro, Ana M.
Farreras Esclusa, Montserrat

REQUIREMENTS
Introduction to Computers
Computer Structure I

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CEFC1. Ability to design, develop, select and value applications and informatic systems affirming its reliability, security and quality corresponding to ethical principals and legislation and current rules.
2. CEFC13. Knowledge and application of necessary tools for storage, processing and access to informatic systems, including the ones based on webs.
3. CEFC4. Ability to work out technical conditions of an informatic installation observing standard and current rules.
4. CEFC7. Knowledge, design and efficient use of data types and structures the most appropriate to resolve problems.
5. CEFC9. Ability to know, understand and assess computer structure and architecture, as well as basic components forming them.

Transversal:
6. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
7. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

Deeper knowledge of the structure of computers, as well as in the design and implementation of small micro-computer based systems. Specifically, it aims to understand and delve into the internal structures and the memory hierarchy (disk, main memory, caches, mechanisms for error detection and correction) in the concepts of concurrency, input / output and buses (survey, interruptions, DMA, types of I / S), and firmware programming of a microcomputer will also be addressed.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>45.0</td>
<td>30.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90.0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15.0</td>
<td>10.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

1. Input/output

Description:
1.1. Devices I/O
1.2. Synchronizing I/O for Polling
1.3. Synchronizing I/O for Interruptions
1.3.8 Exceptions
1.4. Direct Memory Access (DMA)

Related activities:
Activity 1: Problems Input / Output
Activity 2: Lab 1: synchronization by polling
Activity 3: Lab 2: synchronization by interruptions
Activity 4: Partial test of knowledge

Full-or-part-time: 39h
Theory classes: 4h
Practical classes: 8h
Laboratory classes: 4h
Guided activities: 2h
Self study: 21h

2. Cache Memory

Description:
2.1. Introduction to Memory Hierarchy
2.2. Cache memory
2.3. Impact of the Organization of memory cache performance
2.4. Performance Measures
2.5 Design Considerations and cache controller

Related activities:
Activity 1: Cache memory exercises
Activity 2: Lab 3: Memory cache

Full-or-part-time: 30h
Theory classes: 4h
Practical classes: 7h
Laboratory classes: 2h
Guided activities: 2h
Self study: 15h
### 3. Virtual Memory

**Description:**
- 3.1. Introduction
- 3.2. Address translation and pagination
- 3.3. Integrating virtual memory and cache

**Related activities:**
- Activity 1: Virtual memory exercises

**Full-or-part-time:** 20h
- Theory classes: 2h
- Practical classes: 4h
- Laboratory classes: 2h
- Guided activities: 2h
- Self study: 10h

### 4. Microprogramming

**Description:**
- 4.1. Revision Control Unit (INCO)
- 4.2. Types of Control Unit
- 4.3. Microprogrammed control unit

**Related activities:**
- Activity 1: Microprogramming exercises
- Activity 2: Complementary Work
- Activity 3: Knowledge Test

**Full-or-part-time:** 29h
- Theory classes: 3h
- Practical classes: 6h
- Laboratory classes: 2h
- Self study: 18h

### GRADING SYSTEM

Final Mark = (1st Partial knowledge test) * 0.20 + (Lab) * 0.30 + (Complementary work) * 0.15 + (2nd partial knowledge test) * 0.30

\[ \geq 5 \]

The second partial exam may be a partial exam with a weight of 30% or a final exam with a weight of 55% in order to recover the first partial (the student chooses what to do). In this second case the formula is:

Laboratory * 0.30 + complementary work * 0.15 + Final knowledge test * 0.55 \[ \geq 5 \]

The 1st and 2nd partial knowledge tests are reevaluable (o final)

### EXAMINATION RULES.

Laboratory practices are in the presence of the student in the lab room.
In principle, the partial and final exams will be attended by the student in the classroom. Any modification will be announced on the Atenea portal.
In the Activities that are carried out in group the qualification will be the same for all the members of the group.
BIBLIOGRAPHY

Basic: