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:
7. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
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.

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>Total learning time: 150h</th>
<th>Hours large group: 45h 30.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h 0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 15h 10.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h 0.00%</td>
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<tr>
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<td>Self study: 90h 60.00%</td>
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</tbody>
</table>
## Content

### 1. Input/output  
**Learning time:** 39h  
Theory classes: 4h  
Practical classes: 8h  
Laboratory classes: 4h  
Guided activities: 2h  
Self study : 21h

**Description:**  
1.1. Devices E/S: Polling  
1.2. Synchronizing E/S for Interruptions  
1.2.B Exceptions  
1.3. Direct Memory Access (DMA)

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

### 2. Cache Memory  
**Learning time:** 30h  
Theory classes: 4h  
Practical classes: 7h  
Laboratory classes: 2h  
Guided activities: 2h  
Self study : 15h

**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: Memory cache lab
(ENG) 3. Memoria Virtual

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

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

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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 3: Work directed
Activity 4: Test of knowledge

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**Qualification system**

Final Mark = (1st Partial knowledge test )*0,25 + (Exercises)*0,1 + (Lab)*0,2 + (Complementary work)*0,1 + (2nd partial knowledge test)*0,35 >=5

The 1st and 2nd partial knowledge tests are reevaluable

**Bibliography**

**Basic:**