Course guide
270160 - APC - PC Architecture

Unit in charge: Barcelona School of Informatics
Teaching unit: 701 - DAC - Department of Computer Architecture.
Degree: BACHELOR’S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Optional subject).
Academic year: 2022 ECTS Credits: 6.0 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: FERMIN SÁNCHEZ CARRACEDO

Others:
Primer quadrimestre:
JOSEP-LLORENÇ CRUZ DIAZ - 10
AGUSTÍN FERNÁNDEZ JIMÉNEZ - 10
DAVID LÓPEZ ÁLVAREZ - 10
FERMIN SÁNCHEZ CARRACEDO - 10

PRIOR SKILLS

Basic knowledge of computer architecture

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CT3.6. To demonstrate knowledge about the ethical dimension of the company: in general, the social and corporative responsibility and, concretely, the civil and professional responsibilities of the informatics engineer.
CT6.2. To demonstrate knowledge, comprehension and capacity to evaluate the structure and architecture of computers, and the basic components that compound them.
CT8.1. To identify current and emerging technologies and evaluate if they are applicable, to satisfy the users needs.

General:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.

TEACHING METHODOLOGY

The student attends class and study the material presented.
During the course does a report about the subject and makes a public presentation.
By the end of the course makes a practice of assembling and repairing computers in Reutilitzar workshop.
LEARNING OBJECTIVES OF THE SUBJECT

1. Be able to describe the architecture of a current personal computer
2. Having a historical overview of the evolution of processors, semiconductor memories, storage devices, motherboards and BIOS
3. Be able to describe the characteristics of the memory types that can be found on a PC
4. Being able to explain how the motherboards, chipsets and buses work, and how they affect computer performance
5. Being able to explain the basic principles of the BIOS and know how to adjust the BIOS of the computer
6. Be able to describe the components that allow to add new features to a computer
7. Being able to explain the operation and the reason for the existence of graphics cards
8. Being able to describe the transfer system with input/output and storage systems, the basic operating principles and the parameters to consider when incorporating them into a computer
9. Be able to describe some current tools to evaluate the elements in a computer
10. Having a vision of the possible evolution in the short/medium term of all the elements studied
11. Increasing the ability of oral and written communication
12. Acquire a commitment to values such as solidarity, justice and progress
13. Increasing sensitivity to the environment

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>6,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

- Brief history of microprocessors
- Microprocessors for PCs
- Memories for PCs
- Motherboards, BIOS, chipsets and buses
- Graphic cards
- Storage Devices: Hard Drives, CD, DVD, other
- Input/output/devices
Performance Evaluation Software

ACTIVITIES

course work

Description:
Preparation of course work

Specific objectives:
11, 12, 13

Related competencies:
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.

G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 42h 24m
Guided activities: 4h
Self study: 38h 24m

Public presentation of the course work

Description:
Public presentation of the course work

Specific objectives:
11, 12, 13

Related competencies:
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.

G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 8h
Self study: 8h

Subject presentation

Description:
Attendance and class participation

Specific objectives:
12, 13

Related competencies:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Theory classes: 2h
Self study: 0h 48m
### Microprocessors

**Description:**
Attendance and class participation

**Specific objectives:**
1, 2, 10, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 11h
- Theory classes: 8h
- Self study: 3h

### Memory

**Description:**
Attendance and class participation

**Specific objectives:**
2, 3, 10, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 5h 30m
- Theory classes: 4h
- Self study: 1h 30m

### Talks presentations and reports

**Description:**
Attendance and class participation

**Specific objectives:**
11

**Related competencies:**
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.

**Full-or-part-time:** 2h 48m
- Theory classes: 2h
- Self study: 0h 48m
Sustainability and social commitment talk

Description:
Attendance and class participation

Specific objectives:
12, 13

Related competencies:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Theory classes: 2h
Self study: 0h 48m

Motherboards and expansion buses

Description:
Attendance and class participation

Specific objectives:
2, 4, 6, 10, 12, 13

Related competencies:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 5h 30m
Theory classes: 4h
Self study: 1h 30m

First sesion of public presentations

Description:
The student makes a public presentation about the technical report developed

Specific objectives:
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Related competencies:
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Theory classes: 2h
Self study: 0h 48m
### input/output and storage

**Description:**
Attendance and class participation

**Specific objectives:**
2, 6, 8, 10, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 11h
- Theory classes: 8h
- Self study: 3h

### second session of public presentations

**Description:**
The student makes a public presentation about the technical report developed

**Specific objectives:**
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Related competencies:**
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 2h 48m
- Theory classes: 2h
- Self study: 0h 48m

### Graphic cards

**Description:**
Attendance and class participation

**Specific objectives:**
2, 6, 7, 10, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 7h
- Theory classes: 4h
- Self study: 3h
### Media buses

**Description:**
Attendance and class participation

**Specific objectives:**
2, 6, 8, 10, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 2h 48m
Theory classes: 2h
Self study: 0h 48m

### Third session of public presentations

**Description:**
The student makes a public presentation about the technical report developed

**Specific objectives:**
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Related competencies:**
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 2h 48m
Theory classes: 2h
Self study: 0h 48m

### Bios, chipsets and formfactors

**Description:**
Attendance and class participation

**Specific objectives:**
2, 4, 5, 10, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 2h 48m
Theory classes: 2h
Self study: 0h 48m
Fourth session of public presentations

Description:
The student makes a public presentation about the technical report developed

Specific objectives:
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Related competencies:
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Theory classes: 2h
Self study: 0h 48m

Overclocking, termal throttle and refrigeration

Description:
Attendance and class participation

Specific objectives:
2, 9, 10, 12, 13

Related competencies:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Theory classes: 2h
Self study: 0h 48m

Fifth session of public presentations

Description:
The student makes a public presentation about the technical report developed

Specific objectives:
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Related competencies:
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Theory classes: 2h
Self study: 0h 48m
Debriefing course

**Description:**
Attendance and class participation

**Specific objectives:**
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Related competencies:**
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.  
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 8h 12m  
Theory classes: 6h  
Self study: 2h 12m

---

take-home exam

**Description:**
The student solves at home a 16-question exam. Each question has a limited space for your answer. The answer should be concise, complete and correct

**Specific objectives:**
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

**Related competencies:**
G4. EFFECTIVE ORAL AND WRITTEN communication: To communicate with other people knowledge, procedures, results and ideas orally and in a written way. To participate in discussions about topics related to the activity of a technical informatics engineer.  
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 15h  
Guided activities: 2h  
Self study: 13h

---

Practice 1 in Reuse workshop

**Description:**
The student sets up a computer

**Specific objectives:**
1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13

**Related competencies:**
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

**Full-or-part-time:** 2h 48m  
Guided activities: 2h  
Self study: 0h 48m
2nd practice in Reuse workshop

Description:
The student repairs the assigned computers

Specific objectives:
1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 13

Related competencies:
G2. SUSTAINABILITY AND SOCIAL COMPROMISE: to know and understand the complexity of the economic and social phenomena typical of the welfare society. To be capable of analyse and evaluate the social and environmental impact.

Full-or-part-time: 2h 48m
Guided activities: 2h
Self study: 0h 48m

GRADING SYSTEM

A: 20% take-home exam
B: 40% report on the subject + public presentation
C: 10% practice in Reutilitza workshop
D: 30% individual work or teamwork done in class

The non-attendance at class or lack of punctuality subtracts a D grade to the extent that the personal work planned during the class is not performed.

Failure to submit the report or not making the public presentation involve a 0 in B.

The note from the skill "oral and written communication" is calculated from the technical report. The note of skill "Sustainability and social commitment" is calculated from technical report, the practice in the Reutilitza workshop and a special session about sustainability.

BIBLIOGRAPHY

Basic:

Complementary: