Course guide  
240015 - 240015 - Fundamentals of Informatics

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 723 - CS - Department of Computer Science.
Degree: BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).
Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan

LECTURER

Coordinating lecturer: Antoni Soto Riera

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Basic knowledge on the use and programming of computers, operative systems, data bases and computer software with an engineering application.

TEACHING METHODOLOGY

The module is based on 2 weekly classroom hours, in big groups (G), and two weekly laboratory hours, in middle groups (P), in which more applied concepts are developed.

LEARNING OBJECTIVES OF THE SUBJECT

1. Applying fundamental concepts of computer programming.
2. Demonstrating skills in using basic programming tools and techniques.
3. Solving problems by means of developing small and medium scale programmes at an industrial level.
4. Using abstract models to solve real problems.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h
### Topic 1. Working environment

**Description:**
Basic laboratory tools.
- ETSEIB's computer system. Available resources
- Basic use of Linux's graphic interface.
- Use of shell's interface. Basic commands.
- Emacs' text editor.
- Use of Python's interpreter

**Related competencies:**
CE3. Basic knowledge on the use and programming of computers, operative systems, data bases and computer software with an engineering application.

**Full-or-part-time:** 10h  
Practical classes: 4h  
Self study: 6h

### Topic 2. Introduction to programming

**Description:**
Fundamental programming elements.
- Algorithm, programme and programming language (Python).
- Types, variables, expressions, assignations.
- Sequential compositions, conditional and iterative.
- Functions, headers, parameters, body, call.
- Files and entry/exit.

**Related competencies:**
CE3. Basic knowledge on the use and programming of computers, operative systems, data bases and computer software with an engineering application.

**Full-or-part-time:** 50h  
Theory classes: 10h  
Practical classes: 10h  
Self study: 30h

### Topic 3. Data structure

**Description:**
Native Python’s structural types.
- Strings.
- Lists.
- Tuples.
- Dictionaries.
- Representation of vectors and matrices.

**Related competencies:**
CE3. Basic knowledge on the use and programming of computers, operative systems, data bases and computer software with an engineering application.

**Full-or-part-time:** 50h  
Theory classes: 10h  
Practical classes: 10h  
Self study: 30h
**Topic 4. Programme design**

**Description:**
Introduction to structured programming and targeted to objects.
- Sequential treatment schemes: itinerary and search.
- Documentation and testing programmes.
- Programming targeted to objects, classes and methods. Modules, environments.
- Programmes' performance and programmes' optimisation.

**Related competencies:**
CE3. Basic knowledge on the use and programming of computers, operative systems, data bases and computer software with an engineering application.

**Full-or-part-time:** 40h
- Theory classes: 10h
- Practical classes: 6h
- Self study: 24h

---

**ACTIVITIES**

**LABORATORY’S DELIVERABLE EXERCISES**

**Description:**
These activities are a continuous evaluation. They will take place in the Laboratory classrooms and consist in solving problems with an increasing difficulty, by means of Python's programming. They can be individual or in group 2/3 people.

**Full-or-part-time:** 40h
- Practical classes: 10h
- Self study: 30h

---

**FINAL EXAM**

**Description:**
Activity to gather all acquired knowledge during the semester. Individual activity.

**Full-or-part-time:** 2h
- Self study: 2h

---

**GRADING SYSTEM**

The grade will be determined by a weighted average of the scores on three in-class assignments (L) as follows:

\[ 0.10 \cdot L1 + 0.4 \cdot L2 + 0.5 \cdot L3 \]

Students who do not pass the course can hold a final exam.

In this course, there is no re-assessment (reavaluació) exam, since students already have two chances to pass the course each semester.
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Hyperlink: