Course guides
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: 2021 ECTS Credits: 6.0 Languages: Catalan

LECTURER

Coordinating lecturer: Antoni Soto Riera
Others: Jesús Alonso, Dolors Ayala, José Miguel Rivero, Lluís Talavera, Lluís Vila, Núria Pla, Antoni Soto, Marc Vigo

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, assignments.
- 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 (NL) as follows:

0.10NL1 + 0.4NL2 + 0.5NL3

Students who do not pass the course can hold a final exam. The score obtained in this exam will be the final grade.

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

During the autumn term of the 2020-2021 academic year, despite part-time teaching, the grading method will be the same. Deliverable exercises will be face-to-face.
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Hyperlink:
- "Introduction to Programming using Python". http://www.pasteur.fr/formation/infobio/python