240015 - Fundamentals of Informatics

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 723 - CS - Department of Computer Science
Academic year: 2019
Degree: BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Núria Pia Garcia

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 small 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>Total learning time: 150h</th>
<th>Hours large group: 30h</th>
<th>20.00%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 30h</td>
<td>20.00%</td>
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<tr>
<td></td>
<td>Hours small group: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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</tbody>
</table>
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## Content

<table>
<thead>
<tr>
<th>Topic 1. Working environment</th>
<th>Learning time: 10h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Laboratory classes: 4h</td>
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<tr>
<td></td>
<td>Self study : 6h</td>
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</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Topic 2. Introduction to programming</th>
<th>Learning time: 50h</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
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<tr>
<td></td>
<td>Laboratory classes: 10h</td>
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<tr>
<td></td>
<td>Self study : 30h</td>
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</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Topic 3. Data structure</th>
<th>Learning time: 50h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
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<tr>
<td></td>
<td>Laboratory classes: 10h</td>
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<tr>
<td></td>
<td>Self study : 30h</td>
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</tbody>
</table>

**Description:**
- Native Python's structural types.
- Strings.
- Lists.
- Tuples.
- Dictionaries.
- Representation of vectors and matrices.
### Planning of activities

#### LABORATORY'S DELIVERABLE EXERCISES

<table>
<thead>
<tr>
<th>Hours</th>
<th>Theory classes: 10h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Laboratory classes: 6h</td>
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<tr>
<td></td>
<td>Self study: 30h</td>
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</table>

**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.

#### FINAL EXAM

<table>
<thead>
<tr>
<th>Hours</th>
<th>Theory classes: 10h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Laboratory classes: 6h</td>
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<tr>
<td></td>
<td>Self study: 2h</td>
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</table>

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

### Qualification system

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

\[ 0.10NL1 + 0.45NL2 + 0.45NL3 \]

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 (revaluació) exam, since students already have two chances to pass the course each semester.
Bibliography

Basic:


Complementary:


Others resources:

Hyperlink

Swaroop C.H., "A Byte of Python"
http://www.swaroopch.com/notes/Python

Zeller, "Python programming"

Manual de referència de Python
http://docs.python.org/

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

Manual d’emacs