340380 - PROP-I4O23 - Programming Project

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering
Teaching unit: 723 - CS - Department of Computer Science
Academic year: 2019
Degree: BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2018). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6  Teaching languages: Catalan

Teaching staff

Coordinator: MARIO MARTÍN MUÑOZ
Others: MARIO MARTÍN MUÑOZ

Prior skills

Knowledge of programming and data structures:

- Ability to solve algorithmic problems of medium difficulty from a clear specification, and implement solutions in an imperative programming language.

- Knowledge of basic mechanisms for structuring programs (modularization, encapsulation, abstract data types, classes) and ability to apply them to problems small-sized (a few modules)

- Knowledge of the elements of object oriented programming (classes, objects, mechanisms for implementation).

- Familiarity with object-oriented imperative language.

- Ability to use data structures and programming in this language.

- Ability to use language in this book.

- Mastery of basic strategies for finding and correcting errors in simple modules.

Degree competences to which the subject contributes

Specific:
1. CEC01. Ability to have a thorough understanding of the fundamental principles and models of computation, ability to apply the principles to interpret, select, evaluate, model, and create new concepts, theories, applications and advance the technological development related to computing.
2. CEC02. Ability to understand theoretical basics of programming languages and techniques of lexical, syntactic and semantic associates processing, and apply them to create, design and process languages.
3. CEC03. Ability to assess the computational complexity of a problem, to know algorithmic strategies that may lead to its resolution and to recommend, develop and implement the one which guarantees the best performance according to established requirements.
4. CEC04. Ability to learn basics, paradigms and techniques of intelligent systems and analyze, design and build systems, services and computing applications that use these techniques in any scope.
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Teaching methodology

In the course we work is algorithmic programming techniques through lectures and laboratory classes. In the laboratory classes we look at object oriented programming in a practice, developing programming activities to establish these techniques and finally developing a project of average size for which students must develop the techniques learned in lectures and combine them with object-oriented programming techniques that have been in the laboratory classes.

Learning objectives of the subject

Learning techniques to identify the complexity of a problem and apply the appropriate resolution strategy.
Estrucutra learning of graph to represent combinatorial problems.
Learning the different algorithmic strategies for solving computational problems.
Learn advanced concepts of OOP.

Study load

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

#### Graphs

- Degree competences to which the content contributes:
- Specific objectives:

#### Algorithmic costs

- Degree competences to which the content contributes:
- Specific objectives:

#### Combinatorial Algorithms

- Degree competences to which the content contributes:

#### Greedy algorithms

- Degree competences to which the content contributes:
- Specific objectives:

#### Dynamic Programming

- Degree competences to which the content contributes:

#### Aggregations and divide and conquer

- Degree competences to which the content contributes:
- Specific objectives:

#### Advanced Object Oriented Programming

- Degree competences to which the content contributes:

#### Object Oriented Language: Java

- Degree competences to which the content contributes:
### Planning of activities

<table>
<thead>
<tr>
<th>Activity 1</th>
<th>Hours: 3h</th>
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<tbody>
<tr>
<td></td>
<td>Self study: 1h</td>
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<tr>
<td></td>
<td>Practical classes: 2h</td>
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</table>

<table>
<thead>
<tr>
<th>Activity 2</th>
<th>Hours: 6h</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Practical classes: 2h</td>
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<tr>
<td></td>
<td>Self study: 4h</td>
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</table>

<table>
<thead>
<tr>
<th>Project</th>
<th>Hours: 9h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study: 1h</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 8h</td>
</tr>
</tbody>
</table>

### Qualification system

Theory Grade = \( \max(0.5 \text{ Exam1} + 0.5 \text{ Exam2}; \text{FinalExam}) \)
Small projects grade = \( 0.5 \text{ Small project 1} + 0.5 \text{ small project 2} \)

\[
\text{IF Theory Grade} \geq 3 \text{ then Final Grade} = 0.5 \text{ Theory} + 0.3 \text{ Big project} + 0.2 \text{ Small projects}
\]

\[
\text{Else Final Grade} = 0.7 \text{ Theory} + 0.2 \text{ Big project} + 0.1 \text{ Small projects}
\]

### Bibliography

**Basic:**


**Others resources:**