# 820249 - POOVEIA - Object-Oriented and Visual Programming

<table>
<thead>
<tr>
<th>Coordinating unit:</th>
<th>295 - EEBE - Barcelona East School of Engineering</th>
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<tbody>
<tr>
<td>Teaching unit:</td>
<td>723 - CS - Department of Computer Science</td>
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<tr>
<td>Academic year:</td>
<td>2015</td>
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<tr>
<td>Degree:</td>
<td>BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)</td>
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<td>ECTS credits:</td>
<td>6</td>
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<td>Teaching languages:</td>
<td>Catalan, Spanish</td>
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### Prior skills
Algorithm design. Basic compositions of structured programming. Top-down (stepwise refinement) design. Modular design for reuse. Basic knowledge of some imperative language.

### Requirements
Informatics (first course)

### Degree competences to which the subject contributes

#### Transversal:
1. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

### Teaching methodology
- Active based. Theory is presented indirectly, through examples, when possible, using activity axis concept to integrate knowledge & application.
- Using basic materials (PWP transparencies), that may be accessed via INTRANET & extranet links.
- Each week, there will be a practice (sub-activity axis) that later the student should apply to other example, completing a dossier.
- As a complement, directed activities should be completed, as projects in a higher level.
- Lastly, a final test & Congress session will complete evaluation.

### Learning objectives of the subject
Introduction module, at first semester, don't allow students to get real competencies in professional programming. As a consequence, this advanced module claims to:
- Complete initial vision, with additional capabilities needed by an engineer working in a multidisciplinary environment, including informatic experts.
- Be able to develop with modular design, use dynamic structures & managing exceptions.
- View full cycle from specification & design, viewing life cycle as a component of method, & understanding the need for documentation.
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<table>
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<th>Study load</th>
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<td><strong>Total learning time:</strong> 150h</td>
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<tr>
<td><strong>Hours small group:</strong></td>
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<tr>
<td><strong>Self study:</strong></td>
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### Content

| (ENG) M1. Specification, design & programming with modular criteria | Learning time: 24h |
| | Laboratory classes: 12h |
| | Self study: 12h |

#### Description:
- W1. Introduction & MP concept.
- W2. Information Hiding (IH) concept. MP applications with IH.
- W3. Recursivity.

#### Related activities:
- Concepts presentation.
- Exercises resolution
- LAB practices
- DOSSIER & NP1-t Hmwk

#### Specific objectives:
Consolidate knowledge & capacities of programming, applying MP criteria using IH.

| (ENG) M2. The concept of CLASS (IH, as a TAD, Abstract Data TYPE) | Learning time: 20h |
| | Laboratory classes: 8h |
| | Self study: 12h |

#### Description:
- W5. An OO application.

#### Related activities:
- Concepts presentation.
- Exercises resolution
- LAB practices
- DOSSIER & NP2-LAB

#### Specific objectives:
Specifying, designing & developing a class.
### M3. Dynamic structures

**Description:**
W7. An OO application including dynamic structures.

**Related activities:**
- Concepts presentation.
- Exercises resolution
- LAB practices
- DOSSIER & Np3-t

**Specific objectives:**
Designing using dynamic structures.

**Learning time:** 20h  
Laboratory classes: 8h  
Self study: 12h

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### (ENG) M4. Introduction to Visual Programming (VP)

**Description:**
W9. More about VP. Developing an application using VP.

**Related activities:**
- Concepts presentation.
- Exercises resolution
- LAB practices
- DOSSIER & Np4-LAB

**Specific objectives:**
Develop a simple application using VP.

**Learning time:** 20h  
Laboratory classes: 8h  
Self study: 12h
**(ENG) M5. Classification, inheritance and polymorphism**

**Description:**

**Related activities:**
- Concepts presentation.
- Exercises resolution
- LAB practices
- DOSSIER & np5-t

**Specific objectives:**
Develop a small application using classification & polymorphism.

**Learning time:** 20h
- Laboratory classes: 8h
- Self study: 12h

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**(ENG) M6. Other topics**

**Description:**
W12. Exception management.
W13. Files.
W15. Congress.

**Related activities:**
- Concepts presentation.
- Exercises resolution
- LAB practices
- DOSSIER & NP6 LAB
- Congress

**Specific objectives:**
Advance as much as possible with additional topics.

**Learning time:** 46h
- Laboratory classes: 16h
- Self study: 30h

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**Qualification system**

LAB & dossier = 30%
NP = 30%
Congress = 10%
Final exam = 30%
Bibliography

Basic:
