### Degree competences to which the subject contributes

**Specific:**

1. CE15. Basic knowledge of production and fabrication systems.

2. CE29. Ability to design automation control systems.

**Transversal:**

1. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

2. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.

### Teaching methodology

Master classes, active learning and participative expositive classes, projects and problems based learning, and study of real cases.

### Learning objectives of the subject

- Identify and analyze the elements of a robot, their specifications and terminology.
- Describe and analyze the models of a robot.
- Describe the robot control techniques.
- Know the robot programming techniques.
- Know the criteria, methodology and standards about the implantation of robots, evaluating their integration capability in a social or industrial environment.
# Study load

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

#### (ENG) 1 Background

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 6h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Theory classes: 6h</td>
</tr>
<tr>
<td>Classification</td>
<td></td>
</tr>
<tr>
<td>Brief history</td>
<td></td>
</tr>
<tr>
<td>Robots morphology</td>
<td></td>
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<tr>
<td>Joints</td>
<td></td>
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<tr>
<td>Industrial applications</td>
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</tbody>
</table>

**Related activities:**
- PR1

**Specific objectives:**
Locate the robot in the industrial domain and pay attention to collaborative tasks with humans. Know the different parts that the robot is composed.

#### (ENG) -2 Geometrics, Kinematics and dynamics

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 18h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positional and orientation representation</td>
<td>Theory classes: 18h</td>
</tr>
<tr>
<td>Kinematic modelling</td>
<td></td>
</tr>
<tr>
<td>Dynamic modelling</td>
<td></td>
</tr>
</tbody>
</table>

**Related activities:**
- PR2

**Specific objectives:**
Learn geometry, kinematics and dynamic aspects to understand the robot control movement of the next chapter.
### (ENG) -3 Control and robots programming

**Description:**
- Control architectures
- Control based in dynamic model
- Adaptative control
- Effort control
- Path generation
- GEstual and Textrual programming

**Related activities:**
- PR1, PR2, PR3

**Specific objectives:**
Learn some aspects of dynamic control and programming in order to prepare robotic tasks

**Learning time:**
- Theory classes: 6h

### (ENG) -4 Mobile Robotics

**Description:**
- Introduction to mobile robotics

**Related activities:**
- PR4

**Specific objectives:**
Know the science of the wheeled mobile robots

**Learning time:**
- Theory classes: 4h

### (ENG) PR1 Industrial robots programming

**Description:**
- Introduction to programming robot system
- Programming tools
- Edition and programming
- Examples
- Portfolio

**Specific objectives:**
Learn the basic instructions for the programming of robotic tasks

**Learning time:**
- Theory classes: 4h
# 340128 - SIRO-K6007 - Robotic Systems

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Specific Objectives</th>
<th>Learning Time</th>
<th>Theory Classes</th>
</tr>
</thead>
</table>
| **(ENG) PR2 Robots: Modeling and simulation** | Introduction to the robotics toolbox Matlab  
Study of the spatial transformations  
Study of the kinematic model | Learn to use the mathematic tools in order to analyze the science behind robots | Learning time: 8h  
Theory classes: 8h | |
| **(ENG) PR3 Programming robots tools** | Introduction to programming and simulations robots  
Programming a robotized task  
Programming a robotized system | Know advanced tools for program and simulate industrial robots | Learning time: 2h  
Theory classes: 2h | |
| **(ENG) PR4 Mobile robots** | Programming wheeled mobile robots | Learn to solve mobile robot tasks using the acquired theoretical knowledge | Learning time: 2h  
Theory classes: 2h | |
| **PR5 Miniproject** | Conducting a group project | | Learning time: 10h  
Theory classes: 10h | |
340128 - SIRO-K6O07 - Robotic Systems

**Qualification system**

Individual tests in the middle of the course (60%)
Team work (40%)

Presentations in group about a theme or project related to robotics
Laboratory Practicum and activities proposed during the course

Re-evaluation may be accessed in accordance with school regulations

**Bibliography**

**Basic:**


**Complementary:**

