340128 - SIRO-K6007 - Robotic Systems

Degree competences to which the subject contributes

Specific:
2. CE15. Basic knowledge of production and fabrication systems.
3. CE29. Ability to design automotion 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.
4. 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.
### 340128 - SIRO-K6O07 - Robotic Systems

#### 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>
</tr>
</tbody>
</table>
# Content

## (ENG) 1 Background

### Degree competences to which the content contributes:

**Description:**
- Definition
- Classification
- Brief history
- Robots morphology
- Joints
- Industrial applications

**Related activities:**
- PR1

**Specific objectives:**

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

### Degree competences to which the content contributes:

**Description:**
- Positional and orientation representation
- Kinematic modelling
- Dynamic modelling

**Related activities:**
- PR2

**Specific objectives:**

## (ENG) -3 Control and robots programming

### Degree competences to which the content contributes:

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

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

**Specific objectives:**

## (ENG) -4 Mobile Robotics
Degree competences to which the content contributes:

Description:
Introduction to mobile robotics

Related activities:
PR4

Specific objectives:

### (ENG) PR1 Industrial robots programming

Degree competences to which the content contributes:

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

Specific objectives:

### (ENG) PR2 Robots: Modeling and simulation

Degree competences to which the content contributes:

Description:
Introduction to the robotics toolbox Matlab
Study of the Spacial transformations
Study of the kinematic model

Specific objectives:

### (ENG) PR3 Programming robots tools

Degree competences to which the content contributes:

Description:
Introduction to programming and simulations robots
Programming a robotized task
Programming a robotized system

Specific objectives:

### (ENG) PR4 Mobile robots

Degree competences to which the content contributes:
Description:
Programming wheeled mobile robots

Specific objectives:

Qualification system

Individual tests in the middle of the course (45%)
Presentations in group about a theme or project related to robotics (15%)
Laboratory Practicum and activities proposed during the course (40%)

Bibliography

Basic:


Complementary:


Others resources:

Hyperlink
Robótica Industrial Multimedia. Ponsa, P., Yebra, J. y Lagos, N