The general objective of the course is the presentation of two key technologies used in automated productive environments: industrial robotics and computer vision.

From the students perspective, the specific objectives associated with the field of industrial robotics are the following:
- Know the structure and basic operation of industrial manipulator robots.
- Know the main applications of industrial robots.
- Know the technology of the different elements that make up a robot.
- Know and know how to apply the physical principles necessary for the design and control of robots.
- Know how to program basic tasks in a commercial industrial robot.

Regarding the area of computer vision, the objectives are:
- Know the physical elements that make up an artificial vision system.
- Know the basic steps involved in image processing.
- Know the standard techniques of image processing.
- Know how to program vision applications.
**Study load**

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>45h</th>
<th>30.00%</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>15h</td>
<td>10.00%</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

| **1. Introduction to industrial robotics.** | **Learning time:** 9h  
Theory classes: 3h  
Self study: 6h |
|---|---|
| **Description:**  

| **2. The articulated arm: morphology and components.** | **Learning time:** 9h  
Theory classes: 3h  
Self study: 6h |
|---|---|
| **Description:**  

| **3. Modelling and control.** | **Learning time:** 18h  
Theory classes: 6h  
Self study: 12h |
|---|---|
| **Description:**  

| **4. Robotized cells.** | **Learning time:** 9h  
Theory classes: 3h  
Laboratory classes: 6h |
|---|---|
| **Description:**  
### 5. Robot programming.

**Description:**

**Learning time:** 17h
- Theory classes: 3h
- Laboratory classes: 8h
- Self study: 6h

### 6. Applications.

**Description:**

**Learning time:** 9h
- Theory classes: 3h
- Self study: 6h

### 7. Introduction to computer vision.

**Description:**
Definitions. Application domains. Industrial applications of computer vision.

**Learning time:** 9h
- Theory classes: 3h
- Self study: 6h

### 8. Image acquisition and processing systems.

**Description:**
Components of a computer vision system. Optical devices. Illumination systems. Specialized hardware for image processing.

**Learning time:** 9h
- Theory classes: 3h
- Self study: 6h

### 9. Image processing techniques.

**Description:**

**Learning time:** 27h
- Theory classes: 9h
- Self study: 18h
The evaluation formula used in the course is the following:
- First exam: 35%
- Second exam: 35%
- Laboratory: 20%
- Exercises: 10%

The students will be able to access the re-assessment test that meets the requirements set by the EEBE in its Assessment and Permanence Regulations (https://eebe.upc.edu/ca/estudis/normatives-academiques/documents/eebe-normativa-avaluacio-i-permanencia-18-19-aprovat-je-2018-06-13.pdf)

**Bibliography**

**Basic:**

**Complementary:**