320193 - RA - Applied Robotics

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control
Academic year: 2019
Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Rita Maria Planas Dangla
Others: Juan Carlos Hernandez

Learning objectives of the subject

Study load

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

## Robotics: basic concepts

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
</thead>
</table>
| 1- History of the robotics  
2- Fields of applications  
3- Industrial Robotics  
4- Manipulators and Robots: basic concepts.  
5- Types of Robots:  
  5.1 Industrial Robots: Fundamental features.  
  5.2 Mobile Robots: Fundamental features.  
  5.3 Medic Robots: Fundamental features.  
  5.4 Zoomorphic Robots: Fundamental features.  
  5.5 Android Robots: Fundamental features.  
  5.6 Teleoperated Robots: Fundamental features.  
6- Sensors and actuators for the robotics |

### Learning time: 14h
- Theory classes: 6h  
- Self study: 8h

## Relevant parameters for robot design

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
</thead>
</table>
| - Static Parameters  
- Dynamic Parameters  
- Study of the required functionalities  
- Tasks to do |

### Learning time: 34h
- Theory classes: 4h  
- Laboratory classes: 8h  
- Self study: 22h

## Relevant parameters for end effectors design

<table>
<thead>
<tr>
<th>Description:</th>
</tr>
</thead>
</table>
| End effectors: Fundamental features.  
Adapting End Effectors to the robotized tasks.  
Specific design of End effectors. |

### Learning time: 34h
- Theory classes: 4h  
- Laboratory classes: 8h  
- Self study: 22h
### Robot Programming

<table>
<thead>
<tr>
<th>Learning time:</th>
<th>46h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>8h</td>
</tr>
<tr>
<td>Laboratory classes</td>
<td>14h</td>
</tr>
<tr>
<td>Self study</td>
<td>24h</td>
</tr>
</tbody>
</table>

**Description:**
- Introduction to Robot programming
- TRAPs and Time Control
- Input-Output signal Management in order to integrate Robots in production lines
- Multitasking Robot Programming.
- Operator interface design

### Robot-Environment connection

<table>
<thead>
<tr>
<th>Learning time:</th>
<th>12h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>4h</td>
</tr>
<tr>
<td>Self study</td>
<td>8h</td>
</tr>
</tbody>
</table>

**Description:**
- Robotized tasks:
  - Adapting the environment to the robot. Design of the environment
  - Adapting the robot to the environment: sensory control.

### Robot Safety components design

<table>
<thead>
<tr>
<th>Learning time:</th>
<th>10h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>4h</td>
</tr>
<tr>
<td>Self study</td>
<td>6h</td>
</tr>
</tbody>
</table>

**Description:**
- Robot safety components.
- Robotized task safety components
- Safety regulations inside the robotic field
Bibliography

Basic:


Complementary:


Others resources:

Computer material

RobotStudio

Robot Simulator Software