320191 - ROBAS - Basic Robotics

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control
Academic year: 2018
Degree: BACHELOR’S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR’S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR’S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Jaume Figueras
Others: Laureano Tinoco

Learning objectives of the subject

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 small group:</td>
<td>30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>60.00%</td>
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### Basic Concepts

<table>
<thead>
<tr>
<th>Description</th>
<th>Learning time: 6h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 4h</td>
</tr>
</tbody>
</table>

- History of the robotics
- Fields of application

### Robots and Manipulators

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

content english

### Types of Robots

<table>
<thead>
<tr>
<th>Description</th>
<th>Learning time: 66h</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 8h</td>
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<tr>
<td></td>
<td>Laboratory classes: 22h</td>
</tr>
<tr>
<td></td>
<td>Self study: 36h</td>
</tr>
</tbody>
</table>

- Introduction.
- industrial Robots:
  - fundamental characteristics.
  - Types of Robots.
  - specific Sensors.
- mobile Robots:
  - terrestrial Robots
    - fundamental Characteristics.
    - specific Sensors
  - air Robots
    - fundamental Characteristics.
    - specific Sensors
  - submarine Robots
    - fundamental Characteristics.
    - specific Sensors
- Other robots
### End Effectors

<table>
<thead>
<tr>
<th>Learning time: 6h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td>Self study: 4h</td>
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</tbody>
</table>

**Description:**
- End effectors: Fundamental characteristics.
- Types of End effectors.
- End effectors: Specific design.

### Geometric concepts

<table>
<thead>
<tr>
<th>Learning time: 15h</th>
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<tbody>
<tr>
<td>Theory classes: 5h</td>
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<tr>
<td>Self study: 10h</td>
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</table>

**Description:**
- Object position and orientation.
- Reference frames used by a robotic system.
- Introduction to robot kinematics.

### Robot Programming

<table>
<thead>
<tr>
<th>Learning time: 30h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td>Laboratory classes: 8h</td>
</tr>
<tr>
<td>Self study: 18h</td>
</tr>
</tbody>
</table>

**Description:**
- Introduction to robot programming.
- Programming types.
- Programming Languages: basic and advanced features.
- The robot as a multi task system:
  - Flow control in a robot system programming.
  - Task Control in a robot system programming.
### Robot Application Fields

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 12h</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Introduction to the task robotization</td>
<td></td>
</tr>
<tr>
<td>- Adapting the environment to the robot or adapting the robot to the environment.</td>
<td></td>
</tr>
<tr>
<td>- Fields of robot application:</td>
<td></td>
</tr>
<tr>
<td>- Service Robotics</td>
<td></td>
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<tr>
<td>- Medical Robotics</td>
<td></td>
</tr>
<tr>
<td>- Industrial Robotics</td>
<td></td>
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<tr>
<td>- Robotic in education</td>
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</tbody>
</table>

### Safety

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 3h</th>
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<tbody>
<tr>
<td>- Safety and protection elements</td>
<td></td>
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<tr>
<td>- Safety regulation in the robotized environments</td>
<td></td>
</tr>
</tbody>
</table>

### Bibliography

**Basic:**


**Others resources:**

- **Audiovisual material**
  - Nom recurs
    - Resource