295120 - 295II235 - Robotic Systems

Coordinating unit: 295 - EEBE - Barcelona East School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control
Academic year: 2019
Degree: MASTER’S DEGREE IN INTERDISCIPLINARY AND INNOVATIVE ENGINEERING (Syllabus 2019).
(Teaching unit Optional)
ECTS credits: 6
Teaching languages: English

Teaching staff

Coordinator: Tornil Sin, Sebastian
Others: Benitez Iglesias, Raul
Grau Saldes, Antoni
Ponsa Asensio, Pedro

Prior skills

Basic knowledge about programming, automatic control systems and computer vision.

Degree competences to which the subject contributes

Specific:
CEMUEII-14. Design and manage production processes that include quality control systems using advanced characterization techniques. (Specific competence of the Advanced Manufacturing Systems specialty).

General:
CGMUEII-01. Participate in technological innovation projects in multidisciplinary problems, applying mathematical, analytical, scientific, instrumental, technological and management knowledge.
CGMUEII-05. To communicate hypotheses, procedures and results to specialized and non-specialized audiences in a clear and unambiguous way, both orally and through reports and diagrams, in the context of the development of technical solutions for problems of an interdisciplinary nature.

Transversal:
05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.
03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

Teaching methodology

The course combines lectures (50%) with practical activities at laboratory (50%).

Learning objectives of the subject

Have an overall knowledge of the current development of robotics.
Know the operation, programming and applications of industrial manipulator robots. Be able to program an industrial robot manipulator.
Know the operation of mobile robots and their applications in industrial environments.
Be able to simulate and optimize a productive process that integrates robots.
## Study load

<table>
<thead>
<tr>
<th></th>
<th>Hours large group:</th>
<th>22h</th>
<th>14.67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>0h</td>
<td></td>
<td>0.00%</td>
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<tr>
<td>Hours small group:</td>
<td>22h</td>
<td></td>
<td>14.67%</td>
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<tr>
<td>Guided activities:</td>
<td>4h</td>
<td></td>
<td>2.67%</td>
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<tr>
<td>Self study:</td>
<td>102h</td>
<td></td>
<td>68.00%</td>
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## Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Learning time</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Introduction.</strong></td>
<td><strong>2h</strong></td>
<td><strong>Theory classes: 2h</strong></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td></td>
<td>Introduction to robotics. Robot types. Applications. Economic and social issues.</td>
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<tr>
<td><strong>Robot manipulators.</strong></td>
<td><strong>18h</strong></td>
<td><strong>Theory classes: 8h</strong></td>
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<tr>
<td><strong>Mobile robots.</strong></td>
<td><strong>16h</strong></td>
<td><strong>Theory classes: 8h</strong></td>
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<tr>
<td><strong>Simulation of robotized production systems.</strong></td>
<td><strong>8h</strong></td>
<td><strong>Theory classes: 4h</strong></td>
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<tr>
<td><strong>Laboratory classes: 4h</strong></td>
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<td>Petri nets. Discrete systems simulation.</td>
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<tr>
<td><strong>Seminars on advanced robotics.</strong></td>
<td><strong>4h</strong></td>
<td><strong>Theory classes: 4h</strong></td>
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<tr>
<td><strong>Description:</strong></td>
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<td>Advanced manipulation. Robot programming by demonstration. Human-computer interaction. Bio-inspired robots. Social robotics.</td>
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Qualification system

The final course marks will be calculated from the evaluation of: practical activities carried out at the laboratory (60%); homework (20%); final exam (20%).

Bibliography

Basic:


Complementary:
