Course guide
340603 - SIAC-R1O07 - Advanced Control Systems

Unit in charge: Vilanova i la Geltrú School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.
Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012). (Compulsory subject).

Academic year: 2022  ECTS Credits: 5.0  Languages: Catalan, English

LECTURER

Coordinating lecturer: PAU MARTI COLOM
Others: PAU MARTI COLOM

PRIOR SKILLS

In construction

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. CC01 - Ability to research, design, develop and characterize advanced control systems that enable the dynamic system behave according to the operational performance requirements.
2. CC02 - Ability to analyze the results of the advanced control system integrated into the automated process, formulating alternatives in design or implementation if the controlled system does not reach the required specification.

Transversal:
3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialization and critically assessing the results obtained.

TEACHING METHODOLOGY

Combination of theoretical classes, problem based learning and lab classes

LEARNING OBJECTIVES OF THE SUBJECT

Students will be able to analyse, design and implement advanced control systems

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>30,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>15,0</td>
<td>12.00</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>64.00</td>
</tr>
</tbody>
</table>
Total learning time: 125 h

**CONTENTS**

<table>
<thead>
<tr>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
</tr>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
</tr>
<tr>
<td>In construction</td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
</tr>
<tr>
<td>In construction</td>
</tr>
<tr>
<td><strong>Full-or-part-time:</strong> 2h</td>
</tr>
<tr>
<td>Theory classes: 2h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linear systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
</tr>
<tr>
<td>State space models for linear systems</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
</tr>
<tr>
<td>In construction</td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
</tr>
<tr>
<td>In construction</td>
</tr>
<tr>
<td><strong>Full-or-part-time:</strong> 4h</td>
</tr>
<tr>
<td>Theory classes: 4h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-linear systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
</tr>
<tr>
<td>Non-linear systems</td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
</tr>
<tr>
<td>In construction</td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
</tr>
<tr>
<td>In construction</td>
</tr>
<tr>
<td><strong>Full-or-part-time:</strong> 4h</td>
</tr>
<tr>
<td>Theory classes: 4h</td>
</tr>
</tbody>
</table>
**Advanced techniques for controller design**

**Description:**
Advanced techniques for controller design

**Specific objectives:**
In construction

**Related activities:**
In construction

**Full-or-part-time:** 5h
Theory classes: 5h

---

**ACTIVITIES**

**Systems modeling**

**Description:**
In construction

**Specific objectives:**
In construction

**Material:**
In construction

**Delivery:**
In construction

**Full-or-part-time:** 4h
Laboratory classes: 4h

---

**Controller design**

**Description:**
Controller design

**Material:**
In construction

**Delivery:**
In construction

**Full-or-part-time:** 6h
Laboratory classes: 6h
### Control design feasibility

**Description:**
Control design feasibility

**Specific objectives:**
In construction

**Material:**
En construcción

**Delivery:**
In construction

**Full-or-part-time:** 4h
Laboratory classes: 4h

### Controller implementation

**Description:**
Controller implementation

**Specific objectives:**
In construction

**Material:**
In construction

**Delivery:**
In construction

**Full-or-part-time:** 16h
Laboratory classes: 16h

### GRADING SYSTEM

Final mark: 50% Theory + 50% Labs

Theory is evaluated via exams
Labs are as evaluated according to the lab deliveries.

### EXAMINATION RULES.

Exams are with computer and with class notes
BIBLIOGRAPHY

Basic: