340603 - SIAC-R1007 - Advanced Control Systems

Coordinating unit: 340 - EPSEVG - Vilanova i la Geltrú School of Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control
Academic year: 2017
Degree: MASTER'S DEGREE IN AUTOMATIC SYSTEMS AND INDUSTRIAL ELECTRONICS (Syllabus 2012).
(Teaching unit Compulsory)
ECTS credits: 5  
Teaching languages: Catalan, English

Teaching staff
Coordinator: PAU MARTI COLOM
Others: PAU MARTI COLOM

Opening hours
Timetable: To be defined

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 to behave according to the operational performance requirements.
2. CC02 - Capacity and analyzing 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 specialisation and critically assessing the results obtained.

Teaching methodology
Combinantion 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

| Total learning time: 125h | Hours large group: 15h 12.00% | Hours medium group: 0h 0.00% | Hours small group: 30h 24.00% | Guided activities: 0h 0.00% | Self study: 80h 64.00% |
### Content

| Introduction | Learning time: 2h  
Theory classes: 2h |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Description: Introduction</td>
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<tr>
<td>Related activities: In construction</td>
<td></td>
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<tr>
<td>Specific objectives: In construction</td>
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| Linear systems | Learning time: 4h  
Theory classes: 4h |
<table>
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<tbody>
<tr>
<td>Description: State space models for linear systems</td>
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<tr>
<td>Related activities: In construction</td>
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<tr>
<td>Specific objectives: In construction</td>
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| Non-linear systems | Learning time: 4h  
Theory classes: 4h |
<table>
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<tbody>
<tr>
<td>Description: Non-linear systems</td>
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<tr>
<td>Related activities: In construction</td>
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<td>Specific objectives: In construction</td>
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### Advanced techniques for controller design

<table>
<thead>
<tr>
<th>Learning time: 5h</th>
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<tbody>
<tr>
<td>Theory classes: 5h</td>
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**Description:**
Advanced techniques for controller design

**Related activities:**
In construction

**Specific objectives:**
In construction
## Planning of activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
<th>Laboratory classes</th>
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<tbody>
<tr>
<td><strong>Systems modeling</strong></td>
<td>4h</td>
<td>4h</td>
</tr>
<tr>
<td><strong>Controller design</strong></td>
<td>6h</td>
<td>6h</td>
</tr>
<tr>
<td><strong>Control design feasibility</strong></td>
<td>4h</td>
<td>4h</td>
</tr>
<tr>
<td><strong>Controller implementation</strong></td>
<td>16h</td>
<td>16h</td>
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**Description:**
- In construction

**Support materials:**
- In construction

**Descriptions of the assignments due and their relation to the assessment:**
- In construction

**Specific objectives:**
- In construction

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Laboratory classes: 4h

Hours: 4h

Laboratory classes: 6h

Hours: 6h

Laboratory classes: 4h

Hours: 4h

Laboratory classes: 16h

Hours: 16h

Laboratory classes: 16h

Hours: 16h
### Descriptions of the assignments due and their relation to the assessment:
- In construction

### Specific objectives:
- In construction

### Qualification system

- Final mark: 50% Theory + 50% Labs
- Theory is evaluated via exams
- Labs are as evaluated according to the lab deliveries.

### Regulations for carrying out activities

- Exams are with computer and with class notes

### Bibliography

#### Basic: