220021 - Automatic Control

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 AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR’S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 4,5
Teaching languages: Catalan

Teaching staff
Coordinator: Fatiha Nejjar Akhi-Elarab
Others: Joseba Quevedo, Jordi Damunt

Degree competences to which the subject contributes

Specific:
1. GrETA/GrEVA - An adequate understanding of the following, as applied to engineering: the basics of fluid mechanics; the basic principles of flight control and automation; the main characteristics and physical and mechanical properties of materials

Teaching methodology

It is divided into three parts:
- Attendance lessons of exposition of the contents
- Attendance lessons of evaluable group work.
- Self-study and exercises.
In the first ones, the teacher will expose the theoretical basis of the subject, concepts, methodology and results, that will go along with examples in order to easy the comprehension of the subject.
In the second ones, the students will develop the laboratory practices under the supervision and help of the teacher. The students, autonomously, will study to assimilate the concepts and resolve the exercises.

Learning objectives of the subject

Get the basic knowledge to model, analyse, and design the automatic control systems. It will be given special importance to concepts of stability and performance of closed-loop systems and their limitations. Use of the computer to implement application examples of the concepts.
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#### Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group: 31h 27.56%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h 0.00%</td>
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<tr>
<td></td>
<td>Hours small group: 14h 12.44%</td>
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<td></td>
<td>Guided activities: 0h 0.00%</td>
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<tr>
<td></td>
<td>Self study: 67h 30m 60.00%</td>
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</tbody>
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## Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Learning time</th>
<th>Description</th>
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</table>
| 1. Dynamic system modelling                  | 26h            | Theory classes: 8h  
                                   Laboratory classes: 2h  
                                   Self study : 16h |
| 2. Dynamic system analysis                   | 29h 30m        | Theory classes: 8h  
                                   Laboratory classes: 4h  
                                   Self study : 17h 30m |
| 3. Stability and precision                   | 30h            | Theory classes: 8h  
                                   Laboratory classes: 4h  
                                   Self study : 18h |
| 4. Control system design                     | 27h            | Theory classes: 7h  
                                   Laboratory classes: 4h  
                                   Self study : 16h |
### Planning of activities

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>DESCRIPTION</th>
<th>HOURS</th>
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</thead>
<tbody>
<tr>
<td>ACTIVITY 1: THEORY SESSIONS</td>
<td>Theory classes: 28h</td>
<td>65h 30m</td>
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<td></td>
<td>Self study: 37h 30m</td>
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<tr>
<td>ACTIVITY 2: LABORATORY SESSIONS</td>
<td>Laboratory classes: 14h</td>
<td>34h</td>
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<td>Self study: 20h</td>
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<tr>
<td>ACTIVITY 3: MIDTERM EXAM</td>
<td>Theory classes: 1h 15m</td>
<td>6h 15m</td>
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<td>Self study: 5h</td>
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<tr>
<td>ACTIVITY 4: FINAL EXAM</td>
<td>Theory classes: 1h 15m</td>
<td>6h 15m</td>
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<tr>
<td></td>
<td>Self study: 5h</td>
<td></td>
</tr>
<tr>
<td>ACTIVITY 5: LABORATORY EXAM</td>
<td>Theory classes: 0h 30m</td>
<td>0h 30m</td>
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### Qualification system

Laboratory: 20%
Midterm exam: 35%
Final exam: 35%
Laboratory exam: 10%

Unsatisfactory results in the midterm exam (examen parcial) can be recovered by doing a global exam that covers the first and second part of the course. The global exam will be held on the same date and hour scheduled for the final exam of the course. The mark of this global exam may replace the one obtained in the midterm exam if it is higher than this. All the students, who wish so, can opt for this mechanism by sending an email to the coordinator of the course. Laboratory grades are exempt from this recovering mechanism.

### Regulations for carrying out activities

All the activities are mandatory
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Bibliography

Basic:


Complementary:


Villà, R. Apuntes de dinámicas de sistemas. Barcelona: CPDA ETSEIB.

Others resources: