220022 - Structural Theory

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 737 - RMEE - Department of Strength of Materials and Structural Engineering
Academic year: 2017
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: 7,5
Teaching languages: Spanish

Teaching staff
Coordinator: Rafael Weyler Pérez
Others: Fruitos Bickham, Oscar Alejandro
Alegre Carrasquer, Daniel
Martínez Piñol, José Ramón

Degree competences to which the subject contributes

Specific:
1. GrETA/GrEVA - An understanding of the behaviour of structures under stress in ordinary and extreme conditions.
2. GrETA/GrEVA - An adequate understanding of the following, as applied to engineering: principles of continuum mechanics and techniques for calculating response.

Teaching methodology

It is divided into three parts:
· Theory lessons where the basic concepts are developed. They took place in the classroom and it is used the expositive method.
· Exercises lessons, where the theoretical concepts are applied to the resolution of practical examples. It takes place in the classroom, in smaller groups than the ones of theory lessons.
· Laboratory practices, where, in reduced groups and in a guided way, the students get in contact with the experimental methodology
At the same time, it will be proposed the realization of problems and exercises, as well as the elaboration of a laboratory report that has to be made out of the class hours.

Learning objectives of the subject

Get the student to understand the behaviour of the structures and resistant structures and to be able of design a structure that is capable of support the efforts that the structures are brought under in good conditions, facing breaking and with deformations compatible with their functionality.
## 220022 - Structural Theory

### Study load

<table>
<thead>
<tr>
<th></th>
<th>Total learning time: 187h 30m</th>
<th>Hours large group: 47h</th>
<th>25.07%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 21h</td>
<td>11.20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours small group: 7h</td>
<td>3.73%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self study: 112h 30m</td>
<td>60.00%</td>
<td></td>
</tr>
</tbody>
</table>

### Content

1. **Elasticity fundamentals.**

   **Learning time:** 65h 30m  
   - Self study (distance learning): 40h  
   - Theory classes: 15h  
   - Practical classes: 7h 30m  
   - Laboratory classes: 3h

2. **Prismatic part: Study of the straight section.**

   **Learning time:** 65h  
   - Self study (distance learning): 40h  
   - Theory classes: 17h  
   - Practical classes: 6h  
   - Laboratory classes: 2h

3. **Prismatic part: behaviour.**

   **Learning time:** 31h 30m  
   - Self study (distance learning): 16h 30m  
   - Theory classes: 7h  
   - Practical classes: 6h  
   - Laboratory classes: 2h

4. **Structure calculus**

   **Learning time:** 25h 30m  
   - Self study (distance learning): 16h  
   - Theory classes: 8h  
   - Practical classes: 1h 30m
# Planning of activities

<table>
<thead>
<tr>
<th>Session Type</th>
<th>Hours</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THEORY SESSIONS</strong></td>
<td>77h</td>
<td>Theory classes: 42h Self study: 35h</td>
</tr>
<tr>
<td><strong>PROBLEM SESSIONS</strong></td>
<td>71h</td>
<td>Practical classes: 21h Self study: 50h</td>
</tr>
<tr>
<td><strong>LABORATORY SESSIONS</strong></td>
<td>19h 30m</td>
<td>Laboratory classes: 7h Self study: 12h 30m</td>
</tr>
<tr>
<td><strong>ACTIVITY</strong></td>
<td>15h</td>
<td>Self study: 15h</td>
</tr>
<tr>
<td><strong>EXAMS</strong></td>
<td>5h</td>
<td>Theory classes: 5h</td>
</tr>
</tbody>
</table>

## Qualification system

Laboratory practices: 10%
Partial exam: 30%
Final exam: 50%
Proposed activity 10%
It will be a method to recover unsatisfactory results in the partial exam.

## Regulations for carrying out activities

The laboratory practices along with the laboratory reports are mandatory to pass the subject.
Bibliography

Basic:


Complementary:


