Course guides
220032 - DA - Aeroplane Design

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 220 - ETSEIAT - Terrassa School of Industrial and Aeronautical Engineering.

Degree: BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).
Academic year: 2021  ECTS Credits: 4.5  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: ESTER COMELLAS SANFELIU
Primer quadrimestre: ESTER COMELLAS SANFELIU - Grup: 21

Others:

PRIOR SKILLS

The student must arrive with knowledge of aerodynamics, flight mechanics and aerospace structures. During the course, you must also apply concepts related to economics and materials science.
It is also recommended that students master technical English as it will be used throughout the course.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
3. GrEVA - An adequate understanding of the following, as applied to engineering: calculation methods for aeronautical design and development; the use of aerodynamic experimentation and the most important parameters in theoretical application; the experimental techniques, equipment and measuring instruments used in the discipline; simulation, design, analysis and interpretation of in-flight experiments and operations; aircraft maintenance and certification systems.
4. GrEVA - An adequate understanding of the following, as applied to engineering: aircraft systems and automatic flight control systems in aerospace vehicles.
5. GrEVA - Applied knowledge of aerodynamics, mechanics and thermodynamics, flight mechanics, aircraft engineering (fixed-wing and rotary-wing), structural theory.

Transversal:
2. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

TEACHING METHODOLOGY

Teacher will introduce basic fundamentals of aircraft design in the theory classes.
Practical exercises of each subject will be presented in the practical sessions.
LEARNING OBJECTIVES OF THE SUBJECT

The main objective of this course is to bring students to the different aspects of the Aircraft design:
2. Functional design of the different parts of an airplane. Integration and interferences.
3. Influence of the actions of the aircraft and aerodynamics in the design process.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>31,0</td>
<td>27.56</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>14,0</td>
<td>12.44</td>
</tr>
<tr>
<td>Self study</td>
<td>67,5</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 112.5 h

CONTENTS

**Introduction to aircraft design**

**Description:**
- **Full-or-part-time:** 14h
  - Theory classes: 4h
  - Practical classes: 2h
  - Self study: 8h

**Design of several functional blocks of a plane**

**Description:**
- **Full-or-part-time:** 44h
  - Theory classes: 12h
  - Practical classes: 5h
  - Self study: 27h

**Actions and global design**

**Description:**
- **Full-or-part-time:** 37h 30m
  - Theory classes: 10h
  - Practical classes: 5h
  - Self study: 22h 30m
Structural design of aircraft

Description:

**Full-or-part-time:** 17h
Theory classes: 5h
Practical classes: 2h
Self study: 10h

ACTIVITIES

THEORY LESSONS

**Full-or-part-time:** 88h
Theory classes: 28h
Self study: 60h

PRACTICAL LESSONS

**Full-or-part-time:** 10h
Practical classes: 10h

Mid term work delivery

Description:
First delivery of the work.

**Specific objectives:**
Assess the knowledge of Modules 1 and 2.

Delivery:
Date to be agreed at the beginning of the course.

**Full-or-part-time:** 3h 30m
Theory classes: 2h
Guided activities: 1h 30m

Mid term work delivery

Description:
Mid term work delivery.

Delivery:
Date to be agreed at the beginning of the course.

**Full-or-part-time:** 3h 30m
Theory classes: 2h
Self study: 1h 30m
**Defense of group work.**

**Description:**
Each student will participate in a presentation of the work done in groups, where they will have to synthesize and defend the work done.

**Delivery:**
Date to be agreed at the beginning of the course.

**Full-or-part-time:** 2h 30m
- Practical classes: 2h
- Self study: 0h 30m

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**GRADING SYSTEM**

The grading system will consist of 1 group work and 2 presentations of group work. In mid term evaluation, there will be a presentation of the work (with the sections of the theory explained so far) and a presentation. At the end, the complete work will be delivered and the second presentation will be made. Each student must submit once, either in mid term or at the end.

\[
N_{\text{final}} = 0.4 \times N_{\text{treball_p}} + 0.4 \times N_{\text{treball_final}} + 0.2 \times N_{\text{presentacio_individual}}
\]

Students who want to improve the grade of the delivery of the mid term work, will have the opportunity to modify its content and present it at the final delivery, so that the \(0.4 \times N_{\text{work_p}}\) would be evaluated again.

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**EXAMINATION RULES.**

The evaluation consists of group work 80% and the individual grade of the presentation 20%.

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**BIBLIOGRAPHY**

**Basic:**

**Complementary:**