Course guides
220008 - ENIA - Airspace, Air Navigation and Infrastructure

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 TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).
BACHELOR’S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Compulsory subject).
Academic year: 2020  ECTS Credits: 4.5  Languages: Catalan

LECTURER

Coordinating lecturer: Enrique García Melendo
Others: Jon Tugores, Xavier Roca, Joan Antoni Castillo

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. GrETA/GrEVA - An overall understanding of air navigation systems and the complexity of air traffic

TEACHING METHODOLOGY

In the theoretical classes teachers will explain concepts, methods and results, showing them with some examples to facilitate understanding.
The sessions in the classrooms the teacher guide the student in applying theoretical concepts to workgroup.

LEARNING OBJECTIVES OF THE SUBJECT

Know the organization of the air transport system and air navigation system, their rules and the institutions that regulate these systems, and the elements of the air navigation and their relationship with the airport.
Particularly, to understand the air space structure, the instrumental navigation techniques, the procedures used by airplanes in the controlled air space, the navigations aids and their relationship with the airport both from standpoint of design and operation.

STUDY LOAD

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

Total learning time: 112.5 h
## CONTENTS

### 1. Introduction to air navigation

**Description:**  
1.1 Definitions  
1.2 History  
1.3 Air navigation techniques  

**Full-or-part-time:** 10h  
Theory classes: 2h  
Self study : 8h

### 2. Flight basic instruments

**Description:**  
2.1 Anemometer, altimeter and vertical speed indicator  
2.2 Attitude indicator, artificial horizon and direction indicator  
2.3 Others  

**Full-or-part-time:** 11h  
Theory classes: 3h  
Practical classes: 2h  
Self study : 6h

### 3. Institutional framework

**Description:**  
3.1 Basic regulation  
3.2 National agencies  
3.3 International agencies  

**Full-or-part-time:** 9h  
Theory classes: 2h  
Self study : 7h

### 4. Air navigation systems

**Description:**  
4.1 Visual flight  
4.2 Instrumental flight with VORD/DME  
4.3 Instrumental flight with NDB  
4.4 Instrumental flight with ILS  
4.5 Onboard Systems (ACAS, GPWS)  
4.6 Autonomous systems (INS)  

**Full-or-part-time:** 18h 30m  
Theory classes: 7h  
Practical classes: 4h  
Self study : 7h 30m
5. Airspace

**Description:**
- 5.1 Division of the airspace
- 5.2 Classification of the airspace

**Full-or-part-time:** 16h
- Theory classes: 4h
- Self study: 12h

6. Navigational charts, flight plans and weather service

**Description:**
- 6.1 Navigational charts
- 6.2 Flight plans
- 6.3 Weather service

**Full-or-part-time:** 11h
- Theory classes: 3h
- Practical classes: 2h
- Self study: 6h

7. Air navigation services

**Description:**
- 7.1 Air Traffic Control service (ATC)
- 7.2 Flight Information Service (FIS)
- 7.3 Advisory Service
- 7.4 Alert Service

**Full-or-part-time:** 10h
- Theory classes: 2h
- Self study: 8h

8. Special activities in airspace

**Description:**
- 8.1 UAV

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

9. Airport infrastructures

**Description:**
- 9.1 Construction of airport infrastructure
- 9.2 Examples of airport infrastructure

**Full-or-part-time:** 13h
- Theory classes: 4h
- Practical classes: 4h
- Self study: 5h
GRADING SYSTEM

The final mark is the sum of the following qualifications:

Final Mark = 0.1*Act + 0.45*ExPar + 0.45*ExFinal

Act: Airport infrastructure practise session
ExPar: mid-term exam
ExFinal: Final exam

Any student who does not take the mid-ter exam (Examen Parcial), or wants to improve his/her mid-ter mark, will have the option of improving his/her grade in the final exam. In this case the final grade will be: Max [(0.7*ExFinal + 0.2*ExPar + 0.1*Act), (0.45*ExFinal + 0.45*ExPar + 0.1*Act)], that is, it will improve the grade of the partial exam as long as it is larger.

EXAMINATION RULES.

Except the exam, the teacher is available to be consulted and it’s possible to discuss the activities with the other students. A forum in ATENEA is enable to discuss and share information between the students or to ask for help from other students.

BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Hyperlink:
- www.eurocontrol.int. Eurocontrol
- www.icao.int. International Civil Aviation Organization
- www.aena.es. Aeropuertos Españoles y Navegación Aérea
- www.esa.int. European Space Agency