300322 - PA-OA - Aircraft Propulsion

Coordinating unit: 300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering
Academic year: 2013
Degree: BACHELOR'S DEGREE IN AIR NAVIGATION ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN AIRPORT ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 6

Teaching staff
Coordinator: Definit a la infoweb de l'assignatura.
Others: Definit a la infoweb de l'assignatura.

Learning objectives of the subject

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours medium group: 53h</th>
<th>35.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 13h</td>
<td>8.67%</td>
</tr>
<tr>
<td></td>
<td>Self study: 84h</td>
<td>56.00%</td>
</tr>
</tbody>
</table>

Last update: 13-02-2014
# Content

## Introduction to Aeronautical Propulsion Systems

**Learning time:** 11h  
Theory classes: 5h  
Self study: 6h  

**Description:**  
Aeronautical propulsion system types, basic working principles, uses and limitations.

## Performances and thermodynamical cycle

**Learning time:** 22h  
Theory classes: 5h  
Practical classes: 5h  
Self study: 12h  

**Description:**  
Gas turbine engine performance parameters. Fundamentals of aerothermodynamics, the ideal gas generator, sources of losses, component efficiencies and impact on engine performances.

## Components

**Learning time:** 53h  
Theory classes: 10h  
Practical classes: 10h  
Laboratory classes: 3h  
Self study: 30h  

**Description:**  
Description, analysis, design overview and implementation details of ducting (intake/diffuser, nozzle, mixer), turbomachinery (compressor, fan, turbine) and heating components (combustion chamber, afterburner, heat exchangers).

## Subsystems

**Learning time:** 33h  
Theory classes: 10h  
Practical classes: 5h  
Self study: 18h  

**Description:**  
Accessory components and systems: structural (shafts/spools, casing, bearings...), thermal (bleeds, cooling system), fuel, lubrication, ignition and start, monitoring...
### Applications

<table>
<thead>
<tr>
<th>Learning time</th>
<th>24h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>5h</td>
</tr>
<tr>
<td>Practical classes</td>
<td>2h</td>
</tr>
<tr>
<td>Laboratory classes</td>
<td>3h</td>
</tr>
<tr>
<td>Self study</td>
<td>14h</td>
</tr>
</tbody>
</table>

**Description:**
Details of implementation for the application of the gas generator to turbojet, turbofan, turboprop, turboshaft...

### Maintenance and handling

<table>
<thead>
<tr>
<th>Learning time</th>
<th>7h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes</td>
<td>3h</td>
</tr>
<tr>
<td>Self study</td>
<td>4h</td>
</tr>
</tbody>
</table>

**Description:**
Introduction to engine operation, handling and maintenance.
300322 - PA-OA - Aircraft Propulsion

Planning of activities

**THEORETICAL FUNDAMENTALS OF AERONAUTICAL PROPULSION**

**Hours:** 68h  
Theory classes: 14h  
Practical classes: 12h  
Self study: 42h

**Description:**  
Theory lectures, problem statement and numerical resolution of practical exercises.

**PRACTICAL FUNDAMENTALS OF AERONAUTICAL PROPULSION**

**Hours:** 82h  
Theory classes: 24h  
Practical classes: 10h  
Laboratory classes: 6h  
Self study: 42h

**Description:**  
Theory lectures, practical descriptions and components and subsystems dissection.

**Support materials:**  
Slides, class notes, basic and advanced bibliography.

**Descriptions of the assignments due and their relation to the assessment:**  
Occasional delivery of practical session reports and oral presentations preparation.

**Specific objectives:**  
Acquisition of a series of practical knowledge related to aeronautical propulsion.

Bibliography

**Basic:**


**Complementary:**