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>
## Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Learning time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction to Aeronautical Propulsion Systems</strong></td>
<td>11h</td>
<td><strong>Description:</strong> Aeronautical propulsion system types, basic working principles, uses and limitations.</td>
</tr>
<tr>
<td><strong>Performances and thermodynamical cycle</strong></td>
<td>22h</td>
<td><strong>Description:</strong> Gas turbine engine performance parameters. Fundamentals of aerothermodynamics, the ideal gas generator, sources of losses, component efficiencies and impact on engine performances.</td>
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<tr>
<td><strong>Components</strong></td>
<td>53h</td>
<td><strong>Description:</strong> 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)</td>
</tr>
<tr>
<td><strong>Subsystems</strong></td>
<td>33h</td>
<td><strong>Description:</strong> Accessory components and systems: structural (shafts/spools, casing, bearings...), thermal (bleeds, cooling system), fuel, lubrication, ignition and start, monitoring...</td>
</tr>
</tbody>
</table>

Theory classes: [5h](#)  
Self study: [6h](#)  
Theory classes: [5h](#)  
Practical classes: [5h](#)  
Self study: [12h](#)  
Theory classes: [10h](#)  
Practical classes: [10h](#)  
Laboratory classes: [3h](#)  
Self study: [30h](#)  
Theory classes: [10h](#)  
Practical classes: [5h](#)  
Self study: [18h](#)
## Applications

**Learning time:** 24h
- Theory classes: 5h
- Practical classes: 2h
- Laboratory classes: 3h
- Self study: 14h

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

## Maintenance and handling

**Learning time:** 7h
- Theory classes: 3h
- Self study: 4h

**Description:**
Introduction to engine operation, handling and maintenance.
### Planning of activities

<table>
<thead>
<tr>
<th>THEORETICAL FUNDAMENTALS OF AERONAUTICAL PROPULSION</th>
<th>Hours: 68h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 14h</td>
<td>Practical classes: 12h</td>
</tr>
<tr>
<td>Self study: 42h</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>PRACTICAL FUNDAMENTALS OF AERONAUTICAL PROPULSION</th>
<th>Hours: 82h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 24h</td>
<td>Practical classes: 10h</td>
</tr>
<tr>
<td>Laboratory classes: 6h</td>
<td>Self study: 42h</td>
</tr>
</tbody>
</table>

**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:**