Course guide
300322 - PA-OA - Aircraft Propulsion

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 748 - FIS - Department of Physics.
Degree: BACHELOR’S DEGREE IN AEROSPACE SYSTEMS ENGINEERING (Syllabus 2015). (Optional subject).
Academic year: 2022 ECTS Credits: 6.0 Languages:

LEADER

Coordinating lecturer: Definit a la infoweb de l'assignatura.
Others: Definit a la infoweb de l'assignatura.

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>53,0</td>
<td>35.33</td>
</tr>
<tr>
<td>Hours small group</td>
<td>13,0</td>
<td>8.67</td>
</tr>
<tr>
<td>Self study</td>
<td>84,0</td>
<td>56.00</td>
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</tbody>
</table>

Total learning time: 150 h

CONTENTS

Introduction to Aeronautical Propulsion Systems

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

Full-or-part-time: 11h
Theory classes: 5h
Self study : 6h
### Performances and thermodynamical cycle

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

**Full-or-part-time:** 22h  
Theory classes: 5h  
Practical classes: 5h  
Self study: 12h

### Components

**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)

**Full-or-part-time:** 53h  
Theory classes: 10h  
Practical classes: 10h  
Laboratory classes: 3h  
Self study: 30h

### Subsystems

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

**Full-or-part-time:** 33h  
Theory classes: 10h  
Practical classes: 5h  
Self study: 18h

### Applications

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

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

### Maintenance and handling

**Description:**
Introduction to engine operation, handling and maintenance.

**Full-or-part-time:** 7h  
Theory classes: 3h  
Self study: 4h
ACTIVITIES

THEORETICAL FUNDAMENTALS OF AERONAUTICAL PROPULSION

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

Full-or-part-time: 68h
Theory classes: 14h
Practical classes: 12h
Self study: 42h

PRACTICAL FUNDAMENTALS OF AERONAUTICAL PROPULSION

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

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

Material:
Slides, class notes, basic and advanced bibliography.

Delivery:
Occasional delivery of practical session reports and oral presentations preparation.

Full-or-part-time: 82h
Theory classes: 24h
Practical classes: 10h
Laboratory classes: 6h
Self study: 42h

GRADING SYSTEM

BIBLIOGRAPHY

Basic:

Complementary: