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:

LECTURER
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>
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</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>53.0</td>
<td>35.33</td>
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<tr>
<td>Hours small group</td>
<td>13.0</td>
<td>8.67</td>
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<tr>
<td>Self study</td>
<td>84.0</td>
<td>56.00</td>
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</tbody>
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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
<table>
<thead>
<tr>
<th>Section</th>
<th>Full-or-part-time</th>
<th>Theory classes</th>
<th>Practical classes</th>
<th>Laboratory classes</th>
<th>Self study</th>
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</thead>
<tbody>
<tr>
<td>Performances and thermodynamical cycle</td>
<td>22h</td>
<td>5h</td>
<td>5h</td>
<td></td>
<td>12h</td>
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<tr>
<td>Description:</td>
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<tr>
<td>Gas turbine engine performance parameters. Fundamentals of aero thermodynamics, the ideal gas generator, sources of losses, component efficiencies and impact on engine performances.</td>
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<tr>
<td>Components</td>
<td>53h</td>
<td>10h</td>
<td>10h</td>
<td>3h</td>
<td>30h</td>
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<tr>
<td>Description:</td>
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<tr>
<td>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>
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<tr>
<td>Subsystems</td>
<td>33h</td>
<td>10h</td>
<td>5h</td>
<td>3h</td>
<td>18h</td>
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<tr>
<td>Description:</td>
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<tr>
<td>Accessory components and systems: structural (shafts/spools, casing, bearings...), thermal (bleeds, cooling system), fuel, lubrication, ignition and start, monitoring...</td>
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<tr>
<td>Applications</td>
<td>24h</td>
<td>5h</td>
<td>2h</td>
<td>3h</td>
<td>14h</td>
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<tr>
<td>Description:</td>
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<tr>
<td>Details of implementation for the application of the gas generator to turbojet, turbofan, turboprop, turboshaft...</td>
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<tr>
<td>Maintenance and handling</td>
<td>7h</td>
<td>3h</td>
<td></td>
<td>4h</td>
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<td>Description:</td>
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<tr>
<td>Introduction to engine operation, handling and maintenance.</td>
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## 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

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## GRADING SYSTEM

## BIBLIOGRAPHY

### Basic:

### Complementary: