Course guides
300326 - FPA-OA - Fundamentals of Aeronautical 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: 2021  ECTS Credits: 3.0  Languages: Catalan, English

LECTURER

Coordinating lecturer: Definit a la infoweb de l’assignatura.

Others:

TEACHING METHODOLOGY

Theory classes, problem solving, numerical lab, hands-on lab with a micro-turbojet.

LEARNING OBJECTIVES OF THE SUBJECT

Joule cycle optimisation.
Joule cycle implementation for gas turbine.
Application of gas turbine to aeronautical propulsion: turbojet and turbofan

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>3,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Self study</td>
<td>42,0</td>
<td>56.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>40.00</td>
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</tbody>
</table>

Total learning time: 75 h

CONTENTS

Introduction to Aeronautical Propulsion Systems

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

Full-or-part-time: 14h
Theory classes: 6h
Self study: 8h
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: 14h
Theory classes: 6h
Self study: 8h

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: 14h
Theory classes: 6h
Self study: 8h

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: 7h
Theory classes: 3h
Self study: 4h

Applications

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

Full-or-part-time: 26h
Theory classes: 9h
Laboratory classes: 3h
Self study: 14h

GRADING SYSTEM

Evaluation criteria as define in the course web page.

BIBLIOGRAPHY

Basic: