# AW11 - Engine and powerplant

From the Advanced Master ASAA

(Aviation Safety Aircraft Airworthiness)

## Key elements

Period: **Mid-January**

Estimated duration: **25 hours**

For whom:
**recent graduates, jobseekers and experienced employees**

Location:
**ISAE-SUPAERO, Toulouse**

Language: **English**

## Highlights

- Engineering & certification
- Industrial experience

This module provides the engineering background to understand the aero-thermodynamic operation of the various types of engine, for the purpose of engine certification and for certification of the propulsion system on an aircraft. It defines and explains their key design characteristics, performances and limitations, and the associated key certification requirements and means of compliance as per authorities' regulations.

## Prerequisites

- A good engineering background
- Aircraft architecture and basic aeronautics knowledge
- Aircraft certification process and procedures
- FAR/CS25 safety objectives and basic knowledge of safety analysis (ARP4761)

## Learning objectives

After completing this course, participants will be able to:

- Describe the basics of aerothermodynamics as applied to turbines engines;
- Describe the main engine architectures and components (turbofan, turbo-propeller, turboshaft), their control systems and their interactions with aircraft;
- Describe the main principles of powerplant integration in the aircraft, the involved systems and associated failure conditions;
- Determine and implement certification processes, requirements and means of compliance applicable for engines and powerplant;
- Collect and analyze in-depth and autonomously relevant regulatory certification documents for Engines and Powerplant domains.

## Information and registration

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## Course content

**Aero-thermodynamics of gas turbine**

- General operating principles and physics of gas turbine

**Engine certification**

- Certification procedure
- Certification requirements (EASA CS-E) and means of compliance

**Engine architecture**

- Turbofan, turbo-propeller and turboshaft
- Electronic control systems

**Powerplant installation**

- Powerplant systems, integration and certification (EASA/FAA CS/FAR 25)
- Auxiliary power unit

## Teaching methods

| Teaching methods | Yes |
|---|---|
| Lectures / tutorial | X |
| Collaborative learning | |
| Flipped classroom | |
| Blended learning (online and face to face) | |
| Learning by doing | X |
| Project-based | |
| Simulation | |
| Case study | X |

## Assessment

Written exam