AW8 - Structure

From the Advanced Master ASAA (Aviation Safety: Aircraft Airworthiness)

Key elements

Period: **Early December**

Estimated duration: **50 hours**

For whom:
recent graduates, jobseekers and experienced employees

Location:
ISAE-SUPAERO, Toulouse

Language: **English**

Highlights

- Airplane structure certification
- Experience from the industry
- Case studies

This module provides the essential knowledge to understand the behavior of aircraft metallic and composite materials and structures, and assess their performances and limits. It defines and thoroughly explains the associated key certification requirements and criteria as per authorities' regulations.

Prerequisites

- A good engineering background
- Basic knowledge of flight physics and aeronautics
- Aircraft certification process and procedures

Learning objectives

After completing this course, participants will be able to:

- Describe the airplane architecture from a structure point of view, the dimensioning load cases when designing a structure and the qualitative criteria to select appropriate materials;
- Describe and evaluate loads acting on an airplane on ground and in flight, the airplane flight envelope and associated limitations;
- Describe the ageing effects on a structure and the associated impacts and limitations;
- Describe the parameters and criteria essential, from a safety perspective, to evaluate an airplane structure (metallic and composite) and the related certification strategy;
- Explain the main Structure and Materials certification requirements as per CS-25/FAR-25 Subpart-C/D, their relationship with loads and structural definition of an airplane, and the associated means of compliance;
- Collect and analyze in-depth and autonomously relevant regulatory certification documents for Structure and Materials domains.

Information and registration

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Course content

Introduction to aircraft structure certification

- Certification philosophy - Historical perspective

Structure fundamentals

- Elasticity – Beams – Plates
- Finite elements modelling key points

Materials for aeronautical application

- Properties of metallic and composites materials
- Certification requirements

Aircraft structural architecture

- Aircraft structure
- Static strength – Design principles and sizing criteria

Loads

- Ground and flight loads – Gusts – Flight envelope
- Flexible aircraft and flutter

Fatigue and damage tolerance

- Fatigue endurance and crack propagation – Fatigue tests – Damage tolerance in practice

Ageing aircraft

- Corrosion control and prevention program
- Structure limit of validity – Widespread fatigue damage

Composites structure & Emerging technologies

- Principles for certification and continuing airworthiness of composite structures
- Emerging technologies for structure

Application through aircraft structure certification case-studies

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