THE2 - Helicopter dynamics
From the MS HADA
(Helicopter, Aircraft and Drone Architecture)

Key elements
Period: March
Duration: 30 hours
For whom: recent graduates, jobseekers and experienced employees
Location: AIRBUS HELICOPTERS, Marignane
Language: English

Highlights
• Helicopter vibrations
• Aeroelasticity and Aeromechanics instabilities
• Helicopter Acoustics

This module provides a thorough overview of all helicopter dynamics, ranging from vibrations, elasticity, instabilities and acoustics.

Learning objectives
After completing this course, participants will be able to:
• to describe vibratory and acoustic phenomena in depth under the aspects of stability, fatigue/reliability, monitoring for safety/maintenance and onboard comfort optimization.

Prerequisites
• Basics of aerodynamics

Information and registration
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Course content

Helicopter vibrations:
- Rotor technologies & dynamics
- Structural dynamics
- Rotor balancing theory, rotor tuning methods
- Anti-Vibration device
- Impact of vibrations on Health and Comfort & on equipment reliability
- Health & Usage monitoring systems

Aerelasticity and Aeromechanics instabilities:
- Flutter
- Rotor/fuselage couplings
- Ground & air resonance
- Rotor and fuselage sizing to avoid ground resonance - application
- Drive train torsional instability
- Shaft bending instability
- Active control of dynamic instabilities

Acoustics:
- Helicopter internal noise
- Noise measurements & reduction techniques
- Acoustics and psychoacoustic metrics, health impacts
- Noise sources (rotor noise, aerodynamic noise, mechanical noise)
- Diagnosis/identification of a noise problem
- Helicopter Acoustical simulation

Teaching methods

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<thead>
<tr>
<th>Teaching methods</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Lectures / tutorial</td>
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<tr>
<td>Collaborative learning</td>
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<td>Flipped classroom</td>
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<td>Blended learning (online and face to face)</td>
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<td>Learning by doing</td>
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<td>Project-based</td>
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<td>Simulation</td>
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<td>Case study</td>
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Assessment

Written exam