This module provides an introduction to prognostics and health management (PHM), predictive maintenance and data analytics through the basic theoretical aspects, the benefits that can be gained with their implementation, the key aspects of their implementation. An interactive and practical review of some Machine Learning techniques to aeronautical data analytics case studies will be performed.

**Learning objectives**

After completing this course, participants will be able to:

- Understand key principles of health management and predictive maintenance in aeronautical applications;
- Understand aircraft data generation processes and (big) data environment, and identify associated constraints related services for stakeholders;
- Understand basic concepts of data science as applied to predictive maintenance, based on real use cases, in order to be relevantly involved, as a maintenance engineer, in design of maintenance data-driven solutions and services.

**Highlights**

- Data analytics for maintenance
- Aircraft health management
- Industrial expertise

**Prerequisites**

- Aircraft maintenance concepts knowledge

**Key elements**

- **Period:** Late February to early March
- **Estimated duration:** 25 hours
- **For whom:** recent graduates, jobseekers and experienced employees
- **Location:** ISAE-SUPAERO, Toulouse
- **Language:** English

**Information and registration**

info.exed@isae-supaero.fr
Course content

PHM and predictive maintenance:
• PHM concepts and techniques
• Pragmatic application to aeronautics (models, fluctuations and sensitivity, parameters estimation, implementation)
• PHM costs and impacts on operations
• Perspectives

From aircraft data generation to business cases:
• Aircraft sensors and data/features generation
• Data storage and transfer
• Real-time/off-time data analysis
• Business cases and generated value

Data analytics:
• Introduction to data science and machine learning techniques
• Benefits and usage for maintenance and predictive maintenance
• Case study

Teaching methods

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

Assessment

• Written exam