Extracting knowledge and value from finite data (whether scarce or abundant) in an automated way is the goal of Machine Learning. It aims at giving computers the ability to learn -i.e. progressively improve performance on a specific task- with data, without being explicitly programmed.

This module offers a hands-on approach, through practical use-cases, at the general landscape of learning algorithms and the main problems they solve.

**Prerequisites**
- General knowledge on computer science.
- Work experience in a professional environment.

**Learning objectives**
After completing this course, participants will be able to:
- Link some field problems to their formal Machine Learning counterparts;
- Know the main bottlenecks and challenges of data-driven approaches;
- Know the main categories of Machine Learning algorithms;
- Know the names and principles of key algorithms in Machine Learning;
- Know the basics of common libraries.

**Information and registration**
info.exed@isae-supaero.fr
Course Content

- The data analytics workflow;
- General overview of Machine Learning;
- Unsupervised Learning;
- Geometrical approaches in Supervised Learning;
- Probabilistic approaches in Supervised Learning;
- Ensemble methods;
- Anomaly detection;
- Bio-inspired ML, Neural Networks and Deep Learning;
- Feature engineering and data preprocessing.

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>X</td>
</tr>
<tr>
<td>Project-based</td>
<td></td>
</tr>
<tr>
<td>Simulation</td>
<td>X</td>
</tr>
<tr>
<td>Case study</td>
<td></td>
</tr>
</tbody>
</table>

Assessment

- Hands-on evaluation on a computer (100 %)