



5.00 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Chatelain Philippe ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Main themes	<ol style="list-style-type: none"> <li>1. Fundamentals of air-breathing propulsion                             <ol style="list-style-type: none"> <li>1.1) Dynamical and energetic aspects</li> <li>1.2) Concepts and domains of use</li> </ol> </li> <li>2. Analysis of propulsion systems                             <ol style="list-style-type: none"> <li>2.1) The airscrew</li> <li>2.2) The jet engine</li> <li>2.3) The Ramjet and Scramjet engines</li> <li>2.4) Inlets and nozzles</li> <li>2.5) Technological aspects</li> </ol> </li> <li>3. Advanced concepts and future trends</li> </ol>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>In consideration of the reference table AA of the program " Master's degree civil engineer mechanics ", this course contributes to the development, to the acquisition and to the evaluation of the following experiences of learning:</p> <ul style="list-style-type: none"> <li>• AA1.1, AA1.2, AA1.3</li> <li>• AA2.1, AA2.2, AA2.3</li> <li>1 • AA3.1, AA3.2</li> <li>• AA5.4, AA5.5, AA5.6</li> <li>• AA6.3, AA6.4</li> </ul> <p>Aims to provide an analytical description of systems used in aircraft propulsion, to model their behaviour and to introduce students to performance evaluation and component dimensioning.</p>
Evaluation methods	<p><b><u>Homeworks and laboratories</u></b></p> <p>The laboratory sessions and the homeworks correspond to work that is <u>mandatory</u> and that must be performed during the quadrimester; each within a well-defined time period and with a given deadline for the report, that is graded.</p> <p>It is <u>mandatory</u> to participate physically in each of the laboratory sessions led by an assistant. No laboratory report will be accepted with the name of a student who did not participate in the laboratory.</p> <p>The homework assignments are individual unless announced otherwise.</p> <p>It is not possible to do, or even re-do, any of the work mentioned above outside of the time period that was defined for it within the quadrimester.</p> <p><b><u>Final evaluation</u></b></p> <p>The final evaluation is based on a written exam and homework/laboratory report marks. A report must be produced for each within a specified time frame during the quadrimester and the marks are definitive (these assignments cannot be retaken). The exam is subdivided into 2 parts:</p> <ul style="list-style-type: none"> <li>• theory</li> <li>• practical exercises : performance evaluation and system design</li> </ul> <p>In case of technical issues or in case of fraud suspicion, the lecturers may reserve the right to replace the written exam by an oral exam.</p>
Teaching methods	<p>Lectures</p> <p>Combined use of a slides and virtual board</p> <p>Slides and virtual board contents are provided to the students every other lecture at the latest</p> <p>Course notes are available for the first part of the course: introduction and propellers; the second part (jet propulsion) is being worked on.</p>

Content	<ol style="list-style-type: none"> <li>1. Fundamentals of air-breathing propulsion             <ol style="list-style-type: none"> <li>1.1) Dynamical and energetic aspects</li> <li>1.2) Concepts and domains of use</li> </ol> </li> <li>2. Analysis of propulsion systems             <ol style="list-style-type: none"> <li>2.1) The airscrew</li> <li>2.2) The jet engine</li> <li>2.3) The Ramjet and Scramjet engines</li> <li>2.4) Inlets and nozzles</li> <li>2.5) Technological aspects</li> </ol> </li> <li>3. Advanced concepts and future trends</li> </ol>
Inline resources	<a href="https://moodle.uclouvain.be/course/view.php?id=1539">https://moodle.uclouvain.be/course/view.php?id=1539</a>
Other infos	<p>Lectures:</p> <ul style="list-style-type: none"> <li>• Fluid mechanics and transfer phenomena (LMECA1321)</li> <li>• Thermodynamics and energetics (LMECA1855)</li> <li>• Fluid mechanics and transfer II (LMECA2322) : can be followed concurrently</li> <li>• Aerodynamics of external flows (LMECA23232) : optional as it is complementary</li> </ul> <p>Programming skills: Matlab or Python</p>
Faculty or entity in charge	MECA

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Mechanical Engineering	MECA2M	5		
Master [120] in Electro-mechanical Engineering	ELME2M	5		
Master [120] in Energy Engineering	NRGY2M	5		