


Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 30.0 h	Q1
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Teacher(s)	Chatelain Philippe ;Marichal Yves (compensates Chatelain Philippe) ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	<p>1. Fundamentals of air-breathing propulsion</p> <p>    1.1) Dynamical and energetic aspects</p> <p>    1.2) Concepts and domains of use</p> <p>2. Analysis of propulsion systems</p> <p>    2.1) The airscrew</p> <p>    2.2) The jet engine</p> <p>    2.3) The Ramjet and Scramjet engines</p> <p>    2.4) Inlets and nozzles</p> <p>    2.5) Technological aspects</p> <p>3. Advanced concepts and future trends</p>
Aims	<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>• 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> <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods	<p><b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b></p> <p>The final evaluation is based on a written exam and homework/laboratory report marks. The homework assignments and laboratory activities are <u>mandatory</u>, and individual unless announced otherwise. A report must be produced for each within a specified time frame 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><b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b></p> <p>Course notes are being prepared and will be made available in electronic format during the term.</p> <p>Lecture slides will also be available</p>
Content	<p>1. Fundamentals of air-breathing propulsion</p> <p>    1.1) Dynamical and energetic aspects</p> <p>    1.2) Concepts and domains of use</p> <p>2. Analysis of propulsion systems</p> <p>    2.1) The airscrew</p>

	<p>2.2) The jet engine                  2.3) The Ramjet and Scramjet engines                  2.4) Inlets and nozzles                  2.5) Technological aspects                  3. Advanced concepts and future trends</p>
Inline resources	<p><a href="http://moodleucl.uclouvain.be/enrol/index.php?id=8367">http://moodleucl.uclouvain.be/enrol/index.php?id=8367</a></p>
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	<p>MECA</p>

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