

5.0 credits	30.0 h + 22.5 h	2q
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Teacher(s) :	Pardoen Thomas ; Bailly Christian ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	<p>1. Basics of materials selection procedures</p> <ul style="list-style-type: none"> <li>- Space of materials, processes and products</li> <li>- Recall of structural mechanics basics</li> <li>- Performance indices</li> <li>- Selection methods (+ training to the software developed at Cambridge by M. Ashby)</li> </ul> <p>2. Transversal aspects</p> <ul style="list-style-type: none"> <li>- Coatings, thin films and multilayers, mechanical, chemical and durability aspects.</li> <li>- Lightweight and ecoefficient structures, truss lattices, sponges, foams,</li> <li>- assembling (bonding, welding, riveting, self-assembly, brazing )</li> <li>- biomimetism</li> <li>- others</li> </ul> <p>3. Applications</p> <p>examples</p> <ul style="list-style-type: none"> <li>- materials selection by nature (bones, wood, )</li> <li>- materials selection in advanced engines (turboreactor, )</li> <li>- materials selection for microelectronics applications</li> <li>- materials selection for aeronautical structures</li> <li>- materials selection in nuclear applications</li> <li>-</li> </ul>
Aims :	<p>This course provides an introduction to the modern procedures of materials selection with respect to a set of performances. The focus is essentially on structural properties but the course also addresses issues related to multifunctionality in which biological, functional and structural properties are combined. The course opens to modern materials which more and more consists of multimaterials systems, comprising composites, multilayers, coatings, assemblies, functionalized surfaces.</p> <p>At the end of the course, the students will master (1) the basic concept of materials selection procedures and (2) the methodologies involved in such procedures.</p> <p>They will be able to explain the importance of the "multiproperty" dimensions in the selection of materials and the link with optimized structures.</p> <p>They will also be able to analyse specific engineering problems.</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>
Content :	<p>Part 1: Basics of materials selection procedures</p> <p>Part 2. Transversal aspects</p> <p>Part 3. Applications</p> <p>Projects on specific materials selection problems</p>
Other infos :	<p>MAPR 1805 introduction to materials science</p> <p>MAPR 2481 or structural mechanics basics</p>
Cycle and year of study :	<p><a href="#">&gt; Master [120] in Chemical and Materials Engineering</a></p> <p><a href="#">&gt; Master [120] in Electro-mechanical Engineering</a></p> <p><a href="#">&gt; Master [120] in Electrical Engineering</a></p> <p><a href="#">&gt; Master [120] in Physical Engineering</a></p>

Faculty or entity in charge:	FYKI
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