

3 credits

20.0 h + 15.0 h

Q1

Teacher(s)	Faux Pascaline ;
Language :	French
Place of the course	Tournai
Prerequisites	<i>The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet.</i>
Main themes	This teaching unit cover the basic concepts of the physics of walls, hygrothermal comfort and air quality. In particular, it is designed to make students familiar with the notions of mechanical and thermal energy, interior thermal comfort and heat and steam transfer through ventilation and within the walls of a building.
Aims	<p>This teaching unit focuses particularly on two dimensions of the profile of a Bachelor level graduate in Architecture: developing a technical dimension and making use of other disciplines.</p> <p><b>Specific learning outcomes:</b></p> <p>By the end of this course, students will be able to</p> <ul style="list-style-type: none"> <li>• describe the methods of thermal transfer in material.</li> <li>• clarify the parameters of hygrothermal comfort and air quality and determine, in a static situation, how to achieve this comfort.</li> <li>• establish the main dimensions linked to the thermal qualities of buildings : thermal transmission coefficient of walls, nominal thermal loss in buildings during winter, power and quantity of energy used for heating, rate of air circulation etc.</li> <li>• calculate the change in temperature and the transfer of steam within an opaque or glazed wall, in a static situation.</li> <li>1 • detect and estimate the risks of superficial and internal condensation of a wall, for a given climatic situation, both internally and externally.</li> <li>• specify the thermal bridges and assess their impact.</li> </ul> <p><b>Contribution to the learning outcome reference framework:</b></p> <p><b>Make use of other subjects</b></p> <ul style="list-style-type: none"> <li>• Seek out other approaches, exchanges of views and ways of enhancing thinking about architecture</li> <li>• Interpret the knowledge of other subjects</li> </ul> <p><b>Use the technical dimension</b></p> <ul style="list-style-type: none"> <li>• Be familiar with and describe the main technical principles of building</li> <li>• Be able to apply the various basic technical principles in a producing a work of architecture</li> </ul> <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	Written exam: theory and exercises
Teaching methods	Theory: lessons in auditorium Exercices: two students groups works
Content	<p><b>Theory</b></p> <ul style="list-style-type: none"> <li>• Energy (work and heat) - Power</li> <li>• Heat propagation modes</li> <li>• Comfort and architecture: thermal comfort and comfort based on air quality</li> <li>• House energy appraisal: transmission losses and ventilation losses. Nominal power for heating. Thermal bridges</li> <li>• Hygrothermal - risks of internal condensation</li> </ul> <p><b>Exercices</b></p> <ul style="list-style-type: none"> <li>• Exercices with heat/work/power notions</li> <li>• Study case: analysis of a unifamilial house</li> <li>• Thermal transmission coefficients</li> <li>• Global level of insulation (k)</li> </ul>

	<ul style="list-style-type: none"> <li>• Ventilation : sizing principles</li> <li>• Risk analysis of internal condensation (Glaser method)</li> </ul>
Inline resources	<p>Publications « architecture et climat », université catholique de Louvain [<a href="http://www.uclouvain.be/architecture-climat.html">www.uclouvain.be/architecture-climat.html</a>]</p> <p>Energie+ Efficacité énergétique des bâtiments tertiaires [<a href="http://www.energieplus-lesite.be">www.energieplus-lesite.be</a>]</p> <p>EPFL, coursera, Energétique du bâtiment [ <a href="http://moodle.epfl.ch/course/view.php?id=721">http://moodle.epfl.ch/course/view.php?id=721</a> ]</p> <p>Portail de l'énergie en Wallonie [<a href="http://energie.wallonie.be">http://energie.wallonie.be</a>]</p>
Bibliography	Support de cours : copie des présentations PowerPoint
Faculty or entity in charge	LOCI

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Architecture (Tournai)	<a href="#">ARCT1BA</a>	3	<a href="#">LTARC1143</a> AND <a href="#">LTARC1144</a>	