



5 credits

30.0 h + 30.0 h

Q1

Teacher(s)	Jacques Pascal ;Simar Aude ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	<ul style="list-style-type: none"> <li>• The welding processes</li> </ul>
Aims	<p>In consideration of the reference table AA of the program "Masters degree in Mechanical Engineering", 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>• AA2.2, AA2.4, AA2.5</li> <li>• AA3.1, AA3.2</li> <li>• AA5.2, AA5.3, AA5.4</li> <li>1 • AA6.1, AA6.2</li> </ul> <ul style="list-style-type: none"> <li>• Understand the main characteristics of each welding process.</li> <li>• Choose the best welding process for a given assembly.</li> <li>• Understand the physical principles underlying the joining operations by welding.</li> <li>• Anticipate the modifications of the microstructure that will be the result of a given welding operation (phase transformation, defects, ').</li> <li>• Discuss the consequences of the welding operation on the thermal cycle and the resulting residual stresses and distortions.</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	Oral exam with written preparation
Teaching methods	Lectures and practical laboratories with small groups of students
Content	<ul style="list-style-type: none"> <li>• Definition of welding, welding joint and weldability.</li> <li>• Influence of the heat input.</li> <li>• The welding processes: gas welding, arc welding, resistance welding, ...</li> <li>• The evolution of the properties in the heat affected zone of the welded joint.</li> <li>• Causes and solutions to avoid the main types of cracking.</li> </ul>
Inline resources	<a href="http://moodleucl.uclouvain.be/enrol/index.php?id=7629">http://moodleucl.uclouvain.be/enrol/index.php?id=7629</a>
Bibliography	<p>Lectures recommandées :</p> <ul style="list-style-type: none"> <li>• Welding metallurgy, S. Kou, Wiley.</li> <li>• Advanced welding systems, J. Cornu, Springer-Verlag.</li> <li>• Modern Welding Technology, H.B. Cary, S.C. Helzer, Pearson, Prentice Hall.</li> <li>• Manufacturing Engineering and Technology, S. Kalpakjian, S.R. Schmid, Pearson.</li> </ul>
Faculty or entity in charge	MECA

<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Electro-mechanical Engineering	<a href="#">ELME2M</a>	5		
Master [120] in Mechanical Engineering	<a href="#">MECA2M</a>	5		
Master [120] in Chemical and Materials Engineering	<a href="#">KIMA2M</a>	5		