

5.0 credits

30.0 h + 30.0 h

1q

Teacher(s) :	Simar Aude ; Delannay Laurent ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	http://icampus.uclouvain.be/claroline/course/index.php?cid=LMECA1451
Main themes :	-- Methodology in the mechanical workshop and for quality assurance. -- Basic principles and machine-tools for machining by cutting, erosion and electrical discharge. -- Basic principles for manufacturing by forming, casting, sintering and welding.
Aims :	Regarding the common AA references of the program "Master ingénieur civil mécaniciens", this course contributes to the development, the acquisition and the evaluation of the following learning outcomes: -- AA1.1, AA1.2, AA1.3 -- AA2.1, AA2.2, AA2.3, AA2.4 -- AA3.1 -- AA5.4 -- AA6.1, AA6.2, AA6.3 More precisely, at the end of the course, students will be able to: -- identify and justify the choice of a manufacturing process that is best suited to produce a commonly used object. -- explain, based on the knowledge of the underlying physical phenomena, the influence of a manufacturing process on the mechanical properties of the final product. -- explain the main challenges of each manufacturing process as well as the existing technological solutions. At the end of the course, students will have a first experience of -- machining of metal parts in a mechanical manufacturing workshop, -- experimental techniques used to characterize stiffness, hardening, hardness and toughness in a mechanical testing laboratory. <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>
Evaluation methods :	Evaluation of the student personal involvement during the lab sessions (20%) and written exam assessing the learning outcomes (80%).
Teaching methods :	-- lectures (introduced with practical problems), -- lecture notes written in French by the teachers (English reference book available), -- solution of exercises in smaller groups, -- laboratories in groups of 3 or 6 students, -- videos showing processes that are not presented in the lab sessions.
Content :	The importance of the industry of mechanical production. The challenges in manufacturing. Machining principles and machine-tool classification - Machining by cutting : planning and turning, boring and drilling, milling, broaching and tapping. - Machining by erosion. Rectification. - Machining with the non-conventional processes.

	<p>Electrical discharge machining</p> <p>Forming</p> <ul style="list-style-type: none"> - Classification of the forming processes according the deformation temperature, the stresses in the matter and the deformation modes. - Forming of the flat products. Stretching, drawing and forming limit diagram. <p>Deep drawing</p> <ul style="list-style-type: none"> - Computation of the forces required for forming. Rolling, drawing and extrusion. - Lubrication. <p>- Presses characteristics. Casting : principles, casting sequences, mold design, main casting processes.</p> <p>Sintering: powder production, compaction, sintering, finishing.</p> <p>Welding and adhesive bonding: definition, welded and adhesive bonded joints, main welding processes.</p> <p>Cutting: classification of the processes.</p>
<p>Cycle and year of study :</p>	<p>> Bachelor in Mathematics</p> <p>> Bachelor in Engineering</p> <p>> Master [120] in Mechanical Engineering</p> <p>> Master [120] in Electro-mechanical Engineering</p>
<p>Faculty or entity in charge:</p>	<p>MECA</p>