lmeca2453

2019

Advanced manufacturing technologies

UCLouvain

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Simar Aude ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	• Manufacturing process selection • Complements on machining and computer assisted processing • Additive manufacturing • Non-conventional machining processes • Virtual manufacturing
Aims	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: • AA1.1, AA1.2, AA1.3 • AA2.1, AA2.4, AA2.5 • AA3.2, AA3.3 • AA4.1, AA4.2, AA4.3, AA4.4 • AA5.1, AA5.5, AA5.6 • AA6.1, AA6.4 More precisely, at the end of the course, the student will be capable to : • Choose a manufacturing process for a given workpiece using quantifiable criteria • Choose optimal cutting conditions (machines, forces, tools, ') • Perceive the interest of computational tools for manufacturing. • Evaluate the interest of additive manufacturing in comparison to classical processing methods • Pose hypothesis for the numerical modelling of manufacturing • Translate the geometry of a workpiece in manufacturing operations • Communicate their needs to the technicians un a manufacturing plant. - - - - *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".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** • Projects are part of the evaluation • Oral exam during the exam session
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** • Magistral courses • Three projects (process selection, computer assisted manufacturing, additive manufacturing FDM) • Plant visits
Content	• Manufacturing process selection : selection strategy, project of process selection. • Complements on machining and computer assisted processing: cutting forces, automatisation, Mastercam programming project and realization on machine. • Additive manufacturing: processes, process selection criteria, metallurgical quality of the workpieces, project on free workpiece in polymer produced by FDM (Fused deposition modelling) • Non-conventional machining processes: electro-erosion, laser cutting, water cutting. • Virtual manufacturing: Hypothesis of finite elements calculations, practical applications case study.
Inline resources	http://moodleucl.uclouvain.be/enrol/index.php?id=7627 lecture slides

Bibliography	• Materials Selection in Mechanical Design, M.F. Ashby, Butterworth Heinemann. E-book disponible par la BST (connexion UCL obligatoire): http://www.sciencedirect.com/science/book/9781856176637 • Manufacturing Engineering and Technology, S. Kalpakjian, S.R. Schmid, Pearson. • Manufacturing processes and equipement, G. Tlusty, Prentice Hall. • Usinage, J.-F. Debongnie, Céfal.
Other infos	Bases of manufacturing are usefull for the understanding of the course but will be recalled in lecture 1
Faculty or entity in charge	MECA

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