LMECA2801

2013-2014

Machine design.

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Raucent Benoît ; Simar Aude ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=LMECA2801
Prerequisites :	Basics of material resistance and technical drawing.
Main themes :	-- Functional analysis of machines and their components -- Properties of component use -- Elements of calculus of machine components.
Aims :	In consideration of the reference table AA of the program " Master's degree civil engineer mechanics ", 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, AA2.2, AA2.3 -- AA3.1, AA3.3 -- AA4.1, AA4.2 -- AA5.1, AA5.3, AA5.4, AA5.5, AA5.6 -- AA6.1, AA6.3, AA6.4 Introduce students to basic conceptional notions of machines: functional analysis of machines and their components, properties of use of components, selection of materials, basic dimensioning. *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 :	The evaluation is based on work throughout the year (labs and PBL) and on an oral exam session. It includes: -- solving a problem (open book) -- answering a theoretical question
Teaching methods :	Parts 1 and 3 are taught via PBL (Problem-Based Learning), followed by synthesizing lectures. Part 2 is taught via lecture courses followed by labs and PBL.
Content :	First part :functional analysis of machines and their components -- Functional requirements (Specification conditions) -- Principal functions of components (actuation, bearing systems , transmission) -- Origin of loads Second part : properties of component use -- Geometric characteristics -- Tolerances and adjustments, shape tolerances, surface conditions, roughness and scale effects -- Residual stresses Third part : elements of calculus of machine components --

	Dimensioning in relation to elastic limits: calculus criteria, stress concentration, effects of residual stress, safety factors
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	Fatigue: dimensioning, calculus methods, residual stress effects
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	Current elements calculus
Bibliography :	For Part 1 :
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	N.Cross, Engineering Design Methods, J. Wilyord Sons, 1991.
	For Parts 2 and 3 :
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	B. de Meester. Machine design : course notes
	For Part 3 :
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	RC. Juvinall and KM Marshek, Fundamentals of Machine Component Design, Wiley and Sons.
	Books can be borrowed from the Science Library.
Cycle and year of study :	> Master [120] in Mechanical Engineering
Faculty or entity in charge:	MECA