LELEC2660

2016-2017

Power electronics

4.0 credits	30.0 h + 15.0 h	1q

Teacher(s) :	Bekemans Marc ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	Moodle > http://moodleucl.uclouvain.be/course/view.php?id=8136
Prerequisites :	Students are expected to master the following skills: basic electrical circuits, electromagnetism concept, internal physics of semiconductors and linear control as they are covered within the courses LELEC1370 " Electrical circuits and measurements", LELEC1350 "Applied electromagnetism", LELEC1330 "Electronic device", LELEC1755 "Electricity complement" and LINMA1510 "Linear control"
Main themes :	-- Theory of electrical circuits -- Semiconductor physics -- Automatic control -- Thermal behaviour -- Magnetics in the frame of energy conversion and motor control with power semiconductor switches
Aims :	In consideration of the reference table AA of the program "master in electrical 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, AA2.3, AA2.5 -- AA3.2, AA3.3 -- AA5.4, AA5.5 More precisely at the end of the course students will be able to -- determine the electrical quantities inside a converter and at its terminals for DC-DC converters, inverters and rectifiers -- evaluate the electrical and thermal stresses of active and passive components in power electronic converters -- build and make use of the small signal model of a converter (in particular of a DC-DC converter) -- size the main components of a converter on the basis of specifications and -- use an Excel file for sizing a converter -- use a power electronic converter as a control device *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 :	Assesment of the practical work on the basis of reports issued by groups of 3 to 4 students (simulation and sizing of converters), (25 % of the final note), Written assesment without documentation (75 % of the final note) with a duration of 3 hours
Teaching methods :	- lectures - tutored solving in groups of problems (simulation and sizing of converters) posted on iCampus - use of softwares (Simulink, Pspice, Excel')

Bibliography :	References : - Fundamentals of Power Electronics, Robert W. Erickson ISBN 0-412-08541-0 - Electronique de Puissance 10ème édition, G. Séguier, F. Labrique, Ph. Delarue, ISBN 978-2-10-073866-3 - Composants à semi-conducteur pour l'électronique de puissance, S. Lefevre, F. Miserez, ISBN 2-7430-0719-2 - Slides on Moodle
Faculty or entity in charge:	ELEC

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Electrical Engineering	ELEC2M	4	-	
Master [120] in Electro-mechanical Engineering	ELME2M	4	-	