lelec2660

2021

Power electronics

5.00 credits	30.0 h + 15.0 h	Q2

Teacher(s)	Bekemans Marc ;
Language :	English
Place of the course	Louvain-la-Neuve
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

Learning outcomes	**At the end of this learning unit, the student is able to :**
	
	1 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

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')
Inline resources	Moodle http://moodleucl.uclouvain.be/course/view.php?id=8136
Bibliography	Références : - 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 - Transparents sur Moodle
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Electrical Engineering	ELEC2M	5		🔍
Master [120] in Electro-mechanical Engineering	ELME2M	5		🔍