

Teacher(s)	Dehez Bruno ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Students are expected to master the following skills: basic knowledge in eletromagnetism and electrical machines, as they are covered within the courses LELEC1755 and LELEC1310
Main themes	• Structure and working principle of the magnetically coupled devices (electromechanical converters, magnetic bearings, magnetic coupling and gears, ...) • Modelling (local/global, electric/magnetic/thermal, numerical/analytical) of these devices • Optimization of these devices
Learning outcomes	At the end of this learning unit, the student is able to : In consideration of the reference table AA of the program "Master in Electro-mechanical Engineering, professional focus in Mechatronics", 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 • AA5.6 • AA6.3, AA6.5 Specific learning outcomes of the course: At the end of the course, the student will be able, based on the technical and scientific literature, to : • understand the working principle of any magnetically coupled devices (electromechanical transducers, magnetic bearings, and magnetic coupling gear, ...); • establish the magnetic, electrical and thermal (elementary) model of such devices; • use these models to analyze and predict the behavior of such devices; • use these models to size or optimize these devices according to given specifications. In addition, he/she will also be able to: • perform a bibliographic search in scientific literature; • perform a critical reading of a scientific article.
Evaluation methods	Students will be evaluated on the basis of: • The preparation and the presentation of the thematic seminar; • The presentation and the report of the project; • A closed book oral exam focusing on the content of the thematic seminars. The final grade is the arithmetic average of the grades obtained for these three assessments. The grades awarded for the seminar and project may be individualised according to the student's involvement in the group during the semester (active participation in guidance/consultation sessions) or the mastery by the student shown during presentations.
Teaching methods	Teaching is organized in the form of: • Thematic seminars dealing with the content of one or more scientific papers. These seminars are prepared and presented in groups of 2 or 3 students. They are preceded by guidance sessions organized each week during the three weeks preceding the presentation of the thematic seminar. They are followed by a question-answer and restructuring session. • A project on the modeling and optimisation of an electromechanical converter. This assignment is carried out in groups of 2 or 3 students and leads to a report and/or a presentation.
Content	The content varies from one year to another, and depends on the collection of scientific papers selected for the thematic seminars
Inline resources	Moodle https://moodle.uclouvain.be/course/view.php?id=1897

Bibliography	Collection d'articles en lien avec les thèmes du cours.
Faculty or entity in charge	ELME

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		
Master [120] in Energy Engineering	NRGY2M	5		