UCL Université catholique de Louvain

LELEC2895

2013-2014

Design of micro and nanosystems

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Francis Laurent (coordinator) ; Flandre Denis ; Raskin Jean-Pierre ; Pardoen Thomas ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=ELEC2895
Prerequisites :	LELEC2560 Micro and Nanofabrication Techniques is a desirable prerequisite. Basic knowledge of electronics, solid-state physics, materials science and chemistry is an advantage.
Aims :	a. Contribution de l'activité au référentiel AA (AA du programme) Axe 1 (1.1, 1.2, 1.3), Axe 2 (2.1, 2.2, 2.3, 2.4, 2.5), Axe 3 (3.1, 3.2, 3.3), Axe 4 (4.2, 4.3, 4.4), Axe 5 (5.1, 5.2, 5.3, 5.4, 5.5, 5.6), Axe 6 (6.1, 6.3, 6.4) b. Formulation spécifique pour cette activité des AA du programme (maximum 10) After this cursus, the student will be able to: -- Describe the transduction principles and scaling effects -- Understand specifications for a MEMS -- Design MEMS and NEMS and use multiphysics simulation softwares and tools -- Identify electronic circuits adapted to MEMS and NEMS -- Identify fabrication techniques required to make such devices -- Analyse the reliability of miniaturised devices -- Present (report) and defend (slides) the results of a group project (with 2 to 4 students) *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 project evaluation is based on the style and content of a written report and an oral presentation made by group. The exam is an open book format.
Teaching methods :	The course is organised as following 8 sessions of theoretical lectures 3 sessions of exercices 2 tutorial sessions to become acquainted with the software required for the project
Content :	1. MEMS design methodology 2. Scale effects and transduction principles 3. Sensors and actuators: electrical, mechanical, thermal, optical, (bio)chemical, etc... 4. Fabrication processes 5. MEMS and CMOS technology circuits co-integration 6. Interconnections and packaging 7. Multiphysics simulations and characterizations
Bibliography :	Supports -- Slides available on iCampus -- Reference books available at the library BST
Cycle and year of study :	> Master [120] in Chemical and Materials Engineering > Master [120] in Electro-mechanical Engineering > Master [120] in Physical Engineering > Master [120] in Electrical Engineering

Faculty or entity in charge:	ELEC