UCLouvain

LELEC2560

2019-2020

Micro and Nanofabrication Techniques

5.0 credits	30.0 h + 30.0 h	2q

Teacher(s) :	Raskin Jean-Pierre ; Hackens Benoît ; Francis Laurent (coordinator) ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> https://moodleucl.uclouvain.be/course/view.php?id=9212
Main themes :	Processing of micro and nanoscopic devices, MEMs, NEMs, and integrated circuits : -- - semiconductor materials and their processing, -- - oxidation, ion implantation ionique, doping, metallisation, plasma... -- - micro & nanolithography, laser machining, etc. -- - micro & nanocharacterisation : SEM, AFM, Ellipsometry, Dektak,...
Aims :	-- 1 Regarding the learning outcomes of the program of "Master in Electrical Engineering", this course contributes to the development and acquisition of the following learning outcomes : -- AA1.1, AA1.2, AA1.3 -- AA2.1, AA2.2, AA2.3, AA2.4, AA2.5 -- AA3.1 , AA3.2, AA3.3 -- AA4.1, AA4.2, AA4.3, AA4.4 -- AA5.1, AA5.2, AA5.3, AA5.4, AA5.5, AA5.6 -- AA6.1, AA6.3 At the end of this course, students will be able to : -- Design the process of a particular micro & nanoscopic device. -- Use process simulation tools -- Make specific process steps in the clean rooms -- Characterize step results in WinFab and Welcome platforms *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 :	Continuous evaluation of a semester work carried out in a group, with intermediate presentations and written reports. Individual oral evaluation in examination session.
Teaching methods :	Students will discuss in groups the elements related to the manufacture of miniaturized devices and will be led to design a complete process using bibliographic materials, supervised laboratory sessions in clean rooms, and interactions with the teaching team. Intermediate reports and presentations with the management team will provide feedback on progress.
Content :	- types of substrates. - MOS transistor. - physical and chemical techniques for thin film deposition: PVD, CVD, PECVD, ALD, etc. - structure transfer: masking, optical and electronic lithography. - etching techniques: etching mechanisms, dry and wet etching, RIE, DRIE, IBE, selectivity of etchings, etc. - special techniques for depositing or engraving thin films.

	- metrology elements (microscopy techniques, optics, electrical measurements, physical and chemical analyses,...).
Bibliography :	Supports disponibles sur Moodle/supports available on Moodle Livre de référence/reference book: "Introduction to microfabrication, 2nd ed.", S. Franssila, John Wiley & Sons, 2010
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 Biomedical Engineering	GBIO2M	5	-	
Master [120] in Chemical and Materials Engineering	KIMA2M	5	-	
Master [120] in Physical Engineering	FYAP2M	5	-	
Master [120] in Electrical Engineering	ELEC2M	5	-	