UCL Université catholique de Louvain

LELEC2710

2013-2014

NANOELECTRONICS

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Bayot Vincent (coordinator) ; Raskin Jean-Pierre ; Francis Laurent ; Flandre Denis ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=LELEC2710
Prerequisites :	Background in solid state physics and besic semiconductor devices (e.g. : LELEC 1330)
Main themes :	The course is focused on the physics of nanoscopic electronic systems (& t;100 nm), i.e. 2D, 1D and OD quantum systems, real quantum wells, ballistic quantum point contacts, electrons in a quantizing magnetic field, diffusion, coherent transport, resonant tunneling.
Aims :	- AA1.1, 1.2, - AA2.1, 2.2, 2.5 - AA3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 5.3, 5.4, 5.5, 5.6, 6.1 The students should finally be able to: - Explain the basic properties of low-dimensional and nanosclpic electron systems. - Predict the behavior of simple nanoscopic devices, based on the knowledge acquired in the course and their project. - Synthetize and present orally the content of a major article in the field of nanoelectronics. *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 :	- Oral presentation of a scientific article to the other classmates. - Written evaluation on the content of the course
Teaching methods :	The courses present interactively the basics of nanocopic devices and analyzes their behavior. The project focuses on understanding more deeply a choosen key device in nanoelectronics. This is based on a bibliographic research.
Content :	Courses are oriented by student questions in order to enlight at best the numerous new concepts of nanoelectronics. Students work on specific developments that are then shared with the other classmates.
Bibliography :	Syllabus, slides, book: The physics of low-dimensional semiconductors, J.H. Davies, Cambridge
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