UCLouvain

lelec2710

2019

Nanoelectronics

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Bayot Vincent (coordinator) ;Hackens Benoît ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The course is focused on the physics of nanoscopic electronic systems (<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	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 • AA2.1, AA2.2, AA2.5 • AA3.1, AA3.2, AA3.3 • AA4.1, AA4.2, AA4.3, AA4.4 1 • AA5.3, AA5.4, AA5.5, AA5.6 • AA6.1 At the end of the course, students will 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	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** - Oral presentation of a scientific article to the other classmates. - Written evaluation on the content of the course
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** 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.
Inline resources	Moodle https://moodleucl.uclouvain.be/enrol/index.php?id=10290
Bibliography	Syllabus, copies de transparents, livres suggérés dont : The physics of low-dimensional semiconductors, J.H. Davies, Cambridge
Other infos	Background in solid state physics and besic semiconductor devices (e.g. : LELEC 1330)
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Physical Engineering	FYAP2M	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Chemical and Materials Engineering	KIMA2M	5		