

5.0 credits	30.0 h + 30.0 h	1q
-------------	-----------------	----

Teacher(s) :	Raskin Jean-Pierre ; Bayot Vincent (coordinator) ; Flandre Denis ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	Identical to description
Aims :	<p>At the end of the course, the students will be able to : - explain the physical background of nanoelectronics, i.e. the specific quantum effects that show up in nanoscale electron devices, - predict or analyze the behavior of nanoscale devices based on the concepts presented in the lectures</p> <p><i>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".</i></p>
Content :	<p>Content :</p> <p>The course introduces new physical concepts related to the confinements of electrons in nanoscale devices. It also describes the behavior of devices exhibiting quantum effects. The chapters are the following : review of quantum mechanics and solid state physics, density of states in low-dimensional systems, crossover between dimensionalities, heterostructures, quantum wells, quantum wires and quantum dots, quantum point contact, tunneling transport, resonant tunneling diode, single-electron transistor, quantum Hall effect.</p> <p>Teaching method :</p> <p>Lectures and exercises are given in an interactive way by emphasizing links with physical concepts. Problem based teaching. When possible, lab activities related to research in the laboratory are proposed.</p>
Other infos :	<p>Prerequisites :</p> <p>Basic knowledge in quantum mechanics and solid-state physics</p> <p>Assessment :</p> <p>Written evaluation</p> <p>Could be given in English</p>
Cycle and year of study :	<p>&gt; <a href="#">Master [120] in Electrical Engineering</a></p> <p>&gt; <a href="#">Master [120] in Electro-mechanical Engineering</a></p> <p>&gt; <a href="#">Master [120] in Physical Engineering</a></p> <p>&gt; <a href="#">Master [120] in Chemical and Materials Engineering</a></p>
Faculty or entity in charge:	ELEC