LELEC1330

2016-2017

Physics of electronics

5.0 credits	30.0 h + 30.0 h	1q

Teacher(s) :	Flandre Denis ; Raskin Jean-Pierre ; Francis Laurent ; Bayot Vincent (coordinator) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	> http://icampus.uclouvain.be/claroline/course/index.php?cid=ELEC1330
Main themes :	Physical basis of electronics (part 1): band structures, semiconductors and metals, phonons, charge transport, generation and recombination of carriers. Basic electronic devices (part 2): PN junction, bipolar transistor, MOSFET.
Aims :	a) Axis 1 (1.1, 1.2, 1.3), Axis 2 (2.1, 2.2) b) At the end of the course, the students will be able to: Part 1: ' explain the concepts by means of mathematical models and graphical representations. ' solve simple problems of semiconductor physics, e.g., Hall effect, illumination,' Part 2: -- Identify the physical mechanisms at play in electronic devices and describe their operation -- Determine the relevant mathematical models of their electrical characteristics in the DC and low frequency small-signal regimes. -- Compare and discuss these models versus the characteristic of real devices. *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 :	Students are evaluated individually on the basis of a written exam including a part of theory (developments of concepts), and another of problem solving (of the same level than those of solved during the practical sessions of the course). A preliminary evaluation on part 1 will take place in S8. A note higher than 13/20 for the preliminary evaluation gives rise to bonus on the final note of the exam.
Teaching methods :	Lectures and practical sessions. The comparison between theory and the characteristics of real devices is important in the teaching approach to discuss and validate the model simplifications.
Content :	The lectures present in a dynamic way, based in good part on questions by the students, the concepts described above. The lectures and the practical sessions are both complementary with the written notes that present the concepts in more details. The exercises aim at applying the course concepts to solve problems related to semiconductor physics and basic electronics devices.
Bibliography :	Notes and list of reference books available on icampus (see above)
Other infos :	This course requires a bachelor level knowledge in general physics and electricity as well as some basics in quantum mechanics.
Faculty or entity in charge:	ELEC