UCLouvain

lelec2531

2020

Design and Architecture of digital electronic systems

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h + 30.0 h	Q1

Teacher(s)	Legat Jean-Didier ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Combinational logic circuits and sequential logic design. Digital building blocks (ALU, registers, ').Hardware description language (SystemVerilog). Microarchitecture of a 32-bit RISC processor (single-cycle processor, multicyle processor and pipelined processor). Embedded processor architecture and I/O systems.
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, AA2.3, AA2.4 • AA5.3 • AA6.1 1 At the end of this course, the students will be able to: • Understand how the digital circuits (combinational circuits, sequential circuits) work • Understand the architecture of programmable circuits (FPGA) • Synthesize and simulate digital circuits in a language such as Verilog or VHDL • Understand the architecture of a RISC processor • Use and program a microcontroller • Understand and implement a digital electronic system - - - - *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.** The evaluation is based on a continuous evaluation during the academic year. The practical details are specified on the course website.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** • Learning is based on courses with compulsory homework. • Each student has at his disposal during the semester an electronic system comprising an FPGA (Altera Cyclone IV) and and PIC32 microcontroller from Microchip. • This course is closely linked to the project LELEC2103: Electronic System
Content	• Combinational logic • Sequential logic • Implementation technology • Simulation language and Verilog synthesis • Main logic circuits: arithmetic circuits, memories, programmable circuits • Architecture and microarchitecture of a RISC processor • Memories (caches, ...) • Architecture of microcontrollers • Peripherals and main communication systems
Inline resources	Moodle http://moodleucl.uclouvain.be/enrol/index.php?id=4
Bibliography	Digital Design and Computer Architecture - David Money Harris @ Sarah L. Harris - 2007, Elsevier

Other infos	None
Faculty or entity in charge	ELEC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Computer Science and Engineering	INFO2M	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Electro-mechanical Engineering	ELME2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		