




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	<p>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:</p> <ul style="list-style-type: none"> • AA1.1, AA1.2 • AA2.1, AA2.2, AA2.3, AA2.4 • AA5.3 • AA6.1 <p>1</p> <p>At the end of this course, the students will be able to:</p> <ul style="list-style-type: none"> • 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 <p>-----</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>
Evaluation methods	An oral or written exam (depending on the session) will be organized, in addition to a possible ongoing evaluation.
Teaching methods	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 Electro-mechanical Engineering	ELME2M	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		
Master [120] in Computer Science and Engineering	INFO2M	5		