

5.0 credits	30.0 h + 30.0 h	2q
-------------	-----------------	----

Teacher(s) :	Legat Jean-Didier ; Lobelle Marc ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Prerequisites :	-- General knowledge of electronics (for instance ELEC 2752 ELEC 2531). -- Passive technical english
Main themes :	-- Specific aspects of real-time software : specific concepts, design method, specific functions and algorithms of real-time operating systems, fault tolerance -- Implementation of small computing systems based on microprocessors -- Programming real-time systems
Aims :	-- To be able to design both the software and hardware aspects of real-time systems. <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>
Evaluation methods :	-- The project performed during the semester is evaluated and taken into account in the course marks. -- Written exam with opportunity of oral presentation during the written exam.
Teaching methods :	-- Traditional lectures or distance learning -- Students will have to design in group a real-time control system. For students in electromechanical engineering, this activity is integrated in a mobile robot project. Students in computing or electronics join normally to the groups of electromechanical engineering students.
Content :	-- Software aspects -- Introduction to real-time systems -- Software design and implementation methods for real-time systems -- Real-time operating systems -- Programming in C on C++ -- Fault tolerance -- Hardware aspects -- Introduction to digital electronic systems (logical circuits families, programmable circuits, memories) -- Microprocessor architecture -- Main peripheral circuits of a computing system (interrupt controllers, direct memory access controllers,...) -- Communication systems (PCI bus)
Bibliography :	Recommended reading -- D.A. Patterson, J.L. Hennessy, "Computer organization & design. The hardware/software interface", Morgan Kaufmann, 1994, 1-55860-282-8. -- P.A. Laplante, "Real-time systems design and analysis. An engineer's handbook", IEEE Press, 1993, 0-7803-0402-0. -- A. Burns, A. Wellings, "Real-Time Systems and Programming Languages", Addison Wesley, 1997, 0-201-40365-X. * A. M. van Tilborg, "Foundations of Real-Time Computing: Formal Specifications and Methods", Kluwer, 1991, 0-7923-9167-5. -- A. M. van Tilborg, G. M. Koob, "Foundations of Real-Time Computing: Scheduling and Resource management", Kluwer, 1991, 0-7923-9166-7. -- The C programming language, B. Kernighan and D. Ritchie, Prentice-Hall, 1988
Cycle and year of study :	<a href="#">&gt; Master [120] in Electrical Engineering</a> <a href="#">&gt; Master [120] in Computer Science and Engineering</a> <a href="#">&gt; Master [120] in Electro-mechanical Engineering</a> <a href="#">&gt; Master [120] in Computer Science</a>
Faculty or entity in charge:	INFO