COURSE DATA SHEET

Academic year 2024-2025

Course title[1]	**Embedded systems**					Course code			MLRC.IA.102
Course type[2]	DI	Category[3]	DA	Year of study	1	Term	1	Credit points	6

Faculty	Automatic Control and Computer Engineering	Number of hours per term[4]					
Major	Systems engineering	Total	C	S	L	P	SI
Specialization	Machine Learning, Robotics and control	150	28	0	14	0	108

Prerequisite courses[5]	Required	
	Recommended	

Course objective[6]	The overall educational objective of this class is to allow students to discover how the computer interacts with its environment. It will provide hands-on experiences of how an embedded system could be used to solve problems.
Specific objectives[7]	1. Understanding how the computer stores and manipulates data, 2. The understanding of embedded systems using modular design and abstraction, 3. The strategic use of memory, 4. Debugging and verification using a simulator and on the real microcontroller 5. How input/output using switches, LEDs, DACs, ADCs, motors, and serial ports, 6. The implementation of an I/O driver, multithreaded programming, 7. Understanding how local variables and parameters work, 8. Simple motors (e.g., open and closed-loop stepper motor control), 9. Design and implementation of elementary data structures
Content[8]	ARM Processors, Digital Logic, Parallel I\O ports, Design and Development, Switch and LED Interfacing, Arrays, Time, and Functional Debugging, Finite State Machines, Serial Interfacing, Digital to Analog Conversion, Analog to Digital Conversion, Data Acquisition and Control

Assessment			Schedule[9]	Percentage of the final grade (minimum grade)[10]
Final assessment form[11] A. Exam	Interim tests	20%	Week 7, 14	70% (minimum 5)
	Seminar / proiect / experimental activity	%		
	Assignments, homeworks			

[1] See program curriculum
[2] DA – deepening course, DS – specialization course (see program curriculum)
[3] DI – required, DO – optional – see program curriculum
[4] Sections 3.8, 3.5, 3.6a,b,c, 3.7 in the Extended Course Data Sheet
[5] According to section 4.1 – Prerequisite courses in the Extended Course Data Sheet
[6] According to section 7.1 in the Extended Course Data Sheet
[7] According to section 7.2 in the Extended Course Data Sheet
[8] Keywords and main descriptors of the course detailed in section 8 of the Extended Course Data Sheet
[9] For interim evaluation: Week 1-14, for preliminary exam – Week 14, for regular exams – Exam session
[10] For some evaluation tests a minimum grade may be required, while the terms of the re-evaluation are clearly specified.
[11] Session exam (E) or colloquium (C)

	Examination procedures and conditions: 1. Grid test; without documentation 2. Theory subject, without documentation	80% (minimum 5)	Exam session	
C. Laboratory	Activity during laboratory work			30% (minimum 5)

Course instructor	Prof. Alexandru Onea	
Seminar / experimental / project activities instructor	Prof. Alexandru Onea	