



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name	Embedded Systems						
2.2 Course Activities Holder	s.l. dr. ing. Ionut Muraretu						
2.3. Practical Activities Holder	s.l. dr. ing. Ionut Muraretu						
2.4. Study Year	4	2.5. Semester	1	2.6. Evaluation type	V	2.7. Discipline regime	DOP

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	4	in which: 3.2 course	2	3.3. sem./lab./pr.	2
3.4. Total hours of curriculum	56	in which: 3.5 course	28	3.6. sem./lab./pr.	28
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					16
Additional documentation in library, on specialized electronic platforms and field					10
Training seminars / labs, homework, portfolios and essays					10
Tutorial					-
Examinations					4
Other activities.....					4
Total hours per individual activities					44
3.8. Total hours per semester					100
3.9. Number of credits					4

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	Microprocessor Systems Design, Assembly Language Programming, System Theory and Automatic Control, Computer Programming, Data Communications
4.2. of competence	Microprocessor Systems Design, Assembly Language Programming, Computer Programming, Data Communications

5. CONDITIONS (where appropriate)

5.1. of the course	• •
5.2. of seminar/ laboratory/project	The deadline for submitting the laboratory work is set by the holder together with the students. Requests for its postponement will not be accepted, except for objectively justified reasons. Also, for late submission of the laboratory works, the works will be penalized with 1 point per week of delay.

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	The student/graduate describes, identifies and summarizes fundamental concepts from embedded and intelligent systems, computer science and information technology and the way they are applied to concrete problems.
Skills (Abilities)	The student/graduate uses programming languages, environments and technologies and specific tools (algorithms, schemes, models, protocols etc.) in solving well-defined problems in systems engineering. The student/graduate evaluates and selects, adapts and extends computer-aided design (CAD) means, dedicated hardware and software packages, for implementing complex systems connected to systems engineering. The student/graduate models at system level and builds numerical control systems, interfaces and systems based on microcontrollers and microprocessors, using integrated hardware-software design (co-design) and software engineering.
Responsibility and autonomy	The student/graduate shows a spirit of initiative and action for updating professional, economic and organizational culture knowledge.

7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. General notions		Lecture based on presenting the notions of the course using a PowerPoint presentation.	2
2. Designing embedded systems			6
3. The components of embedded systems			10
4. Real-time computing systems			4
5. Implementation example			6
Bibliography:			
1. Software Engineering (8h Edition); Ian Sommerville; Addison Wesley; 2004 2. Critical Systems Engineering: note de curs, adaptate dupa Amaar, H. & Lateef, "Realtime Software Engineering with ICASE", West Virginia University, 2004, textbook; 3. Douglass, B.P: Real-Time UML: Advances in the UML for Real-Time Systems, Addison Wesley, 2004 4. Grosu, M.: Sisteme de calcul timp-real - note de curs, an IV C/CE, 2000 5. Software Development and Documentation Standard, MIL-STD-498, US Department of Defence, Washington DC, December, 1994			

6. Douglass, B.P: ROPES: Rapid Object-oriented Process for Embedded Systems, White paper
7. KCS Murti, Design Principles for Embedded Systems, 978-9811632921, Springer, Singapore 2021
8. Raj Kamal, Embedded Systems - SoC, IoT, AI and Real-Time Systems, 978-9353168025, MC GRAW HILL, INDIA 2019

7.2. Seminar/laboratory/project	The method of implementation	Teaching methods	Allocated time (hours)
1. Using the Arduino board		The experimental method, by implementing simple systems using Arduino and various types of components	2
2. The anatomy of an Arduino program			2
3. Using LEDs			2
4. Using push buttons			2
5. LCD			4
6. Temperature and humidity sensors			2
7. Light sensors			2
8. Distance and PIR sensors			4
9. Other types of sensors			4
10. Complex Arduino usage examples			4

Bibliography:

1. Banzi, M, Getting started with Arduino, O'Reilly, 2009
2. Tom Igoe, Making Things Talk: Using Sensors, Networks, and Arduino to see, hear, and feel your world, Published September 2011, O'Reilly
3. Karvinen, K, Make Arduino bots and gadgets, 2011, O'Reilly
4. KCS Murti, Design Principles for Embedded Systems, 978-9811632921, Springer, Singapore 2021
5. Raj Kamal, Embedded Systems - SoC, IoT, AI and Real-Time Systems, 978-9353168025, MC GRAW HILL, INDIA 2019
6. Jim Ledin, Architecting High-Performance Embedded Systems: Design and build high-performance real-time digital systems based on FPGAs and custom circuits, 978-1789955965, Packt Publishing 2021

8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

--

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	A multiple-choice test with 10 theory questions and one problem	Written exam	60%

9.5. Seminar/laboratory/project	L: Laboratory works	The evaluation of the works and of the way the homework is solved is done with grades between 1 and 10	40%
9.6. Minimum standard of performance			
- The written exam grade must be at least 5 - The final grade (FG) is calculated based on the formula: $FG = 0.6*EG + 0.4*LG$ where: - EG is the exam grade, which must be ≥ 5 . - LG is the average of the grades obtained in the laboratory			

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025	s.l. dr. ing. Muraretu Ionut	s.l. dr. ing. Muraretu Ionut

Date of Approval in the Department	Signature of the Department Director,
25.08.2025	Ș.l.dr.ing. Nicolae ENESCU

Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ȘENDRESCU