SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Electronics, Telecommunications and Information Technology
1.3 Department	Applied Electronics
1.4 Field of study	Electronic Engineering and Telecommunications
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Applied electronics/Engineer
1.7 Form of education	IF-Full time
1.8 Subject code	42.00

2. Data about the subject

2.1 Subject name	Microcontrollers - Project						
2.2 Subject area	Theoretical area Methodological area Area of analysis						
2.3 Course responsible/lecturer	-						
2.4 Teachers in charge of applications	Prof. Dorin Petreus, PhD Eng.– Dorin.Petreus@ael.utcluj.ro Assist. Prof. Eniko Szilagyi, PhD Eng. – Eniko.Lazar@ael.utcluj.ro Assist. Prof. Toma Patarau, PhD Eng. – Toma.Patarau@ael.utcluj.ro Eng. Mirela Olteanu, PhD Stud. – Mirela.Olteanu@ael.utcluj.ro						
2.5 Year of study	III	2.6 Semester	2	2.7 Assessment	C	2.8 Subject category	DD/DI

3. Estimated total time

3.1	Number of hours per week	2	3.2	of which, course	0	3.3	Applications	2
3.4	Total hours in the curriculum	28	3.5	of which, course	0	3.6	Applications	28

Individual study	Hours
Manual, lecture material and notes, bibliography	6
Supplementary study in the library, online and in the field	2
Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
Tutoring	2
Exams and tests	2
Other activities	-

3.7 Total hours of individual study	22
3.8 Total hours per semester	50
3.9 Number of credit points	2

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.2 Competence	

5. Requirements (where appropriate)

5.1. For the course	Amphitheatre (with blackboard and video projector), Cluj-Napoca
5.2. For the applications	Laboratory, Cluj-Napoca

6. Specific competences

Professional competences	C3 To apply knowledge, concepts and basic methods regarding computing systems' architecture, microprocessors, microcontrollers, programming languages and techniques C3.1 Description of the operation of a computing system, of the basic principles of the architecture of general-purpose microprocessors and microcontrollers, of the general principles of structured programming C3.2 Use of general-purpose programming languages and of those specific to microprocessor and microcontroller applications; explaining the operation of automatic control systems that use these architectures and interpreting the experimental results C3.3 Solving concrete practical problems including elements of data structures and algorithms, programming and use of microprocessors/microcontrollers C3.4 Elaboration of programs in a general-purpose and / or specific programming language, starting from the specification of the requirements until the execution, debugging and interpretation of the results in correlation with the used processor C3.5 Projects involving hardware (processors) and software (programming) components C4 To design and use low complexity hardware and software applications, specific to Applied Electronics C4.5 Design of dedicated equipment from the fields of applied electronics, which use: microcontrollers, programmable circuits or computing systems with simple architecture, including related programs
Cross competences	N.A.

7. Discipline objectives (as results from the key competences gained)

7.1 General objectives	Developing the competences regarding the use, analysis and design of systems with microcontrollers
7.2 Specific objectives	1. Assimilation of theoretical knowledge regarding the simulation of electronic circuits with microcontrollers 2. Obtaining the skills to use the simulation programs of the electronic circuits with microcontrollers 3. Obtaining the skills to use the specific equipment of the electronic circuits with microcontrollers

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes

8.2 Applications (seminar / laboratory / project)	Teaching methods	Notes
1. Establishing the design theme and requirements	Apolications (Simulation, Eperimental Measurments), blackboard	Use of laboratory instrumentation, experimental and evaluation boards, computers, white/magnetic board
2. Block diagram and flow chart		
3. Choosing the components from at least 3 variants consulted		
4. Organizational chart for each block and how to connect the components		
5. Conditioning circuits		
6. Simulation of modules		
7. Write the functions in assembly or C for each module		
8. Complete schematic of the system		
9. Write the whole program		
10. Testing and optimizing the program		
11. Realization of the electrical scheme		
12. List of components		
13. Making the PCB		
14. Evaluation		
Bibliografy 1. D. Petreuș, E. Szilágyi, R. Etz, T. Pătărău, "Microcontrolere – Aplicații", Editura U.T. PRESS, ISBN: 978-606-737-495-7, Cluj-Napoca, 2021 2. D. Petreuş, G. Munteanu, Z. Juhos, N. Palaghiţă, “Aplicaţii cu microcontrolere din familia 8051”, Editura Mediamira, Cluj-Napoca, 2005 ***On-line references*** www.intel.com, www.philips.com, www.microchip.com;		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The discipline content and the acquired skills are in agreement with the expectations of the professional organizations and the employers in the field, where the students carry out the internship stages and/or occupy a job (in the field of applied electronics), and the expectations of the national organization for quality assurance (ARACIS).

10. Evaluations

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Assessment methods
10.4 Course	The level of knowledge obtained		
10.5 Seminar/Laboratory	The level of acquired abilities	Continuous formative evaluation + final evaluation	100%
10.6 Minimum standard of performance			
Qualitative level: Minimal knowledge: ✓ Knowledge of the basic operation of the studied microcontroller ✓ Knowledge of the basic peripherals of a microcontroller ✓ Knowledge of the basic programing languages to program microcontrollers (C and assembly) Minimal competences: ✓ To be able to describe the functionality of the microcontroller studied			

- ✓ To be able to write a simple program used in microcontroller applications

Quantitative level:

- ✓ Participation to all applications and laboratories
- ✓ The final grade is calculated as follows: M = 0.5 continuous evaluation + 0.5 final evaluation.
- ✓ Conditions: continuous evaluation ≥ 5, final evaluation ≥ 5

Date of filling in:	Holders	Title Name	Signitures
24.06.2024	Course responsible	-	
	Teachers in charge of applications	Prof. Dorin Petreus, PhD Eng.	
		Assist. Prof. Eniko Szilagyi (Lazar), PhD Eng.	
		Assist. Prof. Toma Patarau, PhD Eng.	
		Assist. Eng. Olteanu Mirela, PhD Stud.	

Date of approval in the Department of Applied Electronics

28.06.2024

Head of Department
Prof. Dorin PETREUS, PhD Eng.

Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology

11.07.2024

Dean
Prof. Ovidiu Aurel POP, PhD Eng.