SYLLABUS

1. Information about the program

1.1 Higher education institution	UNIVERSITY POLITEHNICA OF TIMISOARA
1.2 Faculty[1]/ Department [2]	ELECTRONICS, TELECOMUNICATON AND INFORMATION TECHNOLOGIES/EA
1.3 Field of study (name/code[3])	ELECTRONIC ENGINEERING, TELECOMUNICATION AND INFORMATION TECHNOLOGIES
1.4 Study cycle	License
1.5 Study program (name/code/qualification)	TST-ENG/20/20/10/100/10/TST-ENG

2. Information about the discipline

2.1 Name of discipline/ formative category[4]			Microcontrollers /DD				
2.2 Coordinator (holder) of course activities			Conf. dr. ing. Roland SZABÓ				
2.3 Coordinator (holder) of applied activities[5]			Drd. ing. Radu-Ștefan RICMAN				
2.4 Year of study[6]	2	**2.5** Semester	4	**2.6** Type of evaluation	E	**2.7** Regime of discipline[7]	DI

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [8]

3.1 Number of fully assisted hours / week	5 of which:	**3.2** course	3	**3.3** seminar / laboratory / project	0/20
3.1* Total number of fully assisted hours / semester	70 of which:	**3.2*** course	42	**3.3*** seminar / laboratory / project	0/28/0
3.4 Number of hours partially assisted / week	0 of which:	**3.5** training	0	**3.6** hours for diploma project elaboration	0
3.4* Total number of hours partially assisted / semester	0 of which:	**3.5*** training	0	**3.6*** hours for diploma project elaboration	0
3.7 Number of hours of unassisted activities / week	2.14 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			0,5
		hours of individual study after manual, course support, bibliography and notes			1.14
		training seminars / laboratories, homework and papers, portfolios and essays			0,5
3.7* Number of hours of unassisted activities / semester	30 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			7
		hours of individual study after manual, course support, bibliography and notes			16
		training seminars / laboratories, homework and papers, portfolios and essays			7
3.8 Total hours / week [9]	7.14				
3.8* Total hours /semester	100				
3.9 Number of credits	4				

4. **Prerequisites** (where applicable)

[1] The name of the faculty which manages the educational curriculum to which the discipline belongs
[2] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.
[3] The code provided in HG - on the approval of the Nomenclature of fields and specializations / study programs, annually updated.
[4] Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).
[5] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[6] Year of studies in which the discipline is provided in the curriculum.
[7] Discipline may have one of the following regimes: imposed discipline (DI) or compulsory discipline (DOb)-for the other fundamental fields of studies offered by UPT, optional discipline (DO) or optional discipline (Df).
[8] The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.
[9] The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

4.1 Curriculum	• C Language, Digital Integrated Circuits
4.2 Competencies	• Basic Flow of Programming • Top Down and Bottom Up Approaches

5. Conditions (where applicable)

5.1 of the course	• Video projector
5.2 to conduct practical activities	• Laboratory with video projector and 8 test benches: computer, oscilloscope, signal generator, development board

6. Specific competencies acquired through this discipline

Specific competencies	• Application of knowledge, concepts and basic methods related to computer system architecture, microprocessors, microcontrolers, programming languages and techniques
Professional competencies ascribed to the specific competencies	• Application of knowledge, concepts and basic methods related to computer system architecture, microprocessors, microcontrolers, programming languages and techniques.
Transversal competencies ascribed to the specific competencies	• Methodical analysis of field-related problems aimed at identifying acknowledged solutions, thus ensuring the accomplishment of professional tasks

7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	• to present basic knowledge of these devices • to present arguments for the importance and the necessity of the Microprocessors • to introduce general long time valuable issues and characteristics of these devices' family • Power Point presentations and interactive discussions during the courses
7.2 Specific objectives	• Creating applications with microcontrollers and programming them in assesmply and C languages

8. Content [10]

8.1 Course	Number of hours	Teaching methods [11]
The microprocessor and the microcontroller: basic architecture, basic functioning principles	6	Slides, discussion
Concrete examples on the 8051 general use microcontroller and on the HCS 12X Siemens microprocessor	6	
Programming in assembling language	6	
Microprocessors programming in C/C++	6	
PIC16 F452 microcontrollers	6	

[10] It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".
[11] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

8086 microprocessor family	6	
32-bit architectures	3	
AMD Athlon 64 FX-55 Processor	3	

Bibliography [12] 1. Rodnay Zaks, Intoduction to microprocessors, Sybex Inc, Berkley CA USA, 1999.
2. Hosein Sabaghian Bidgoli, 8051 Microcontroller, Kashan University, 2005,
3. http://ce.kashanu.ac.ir/sabaghian/micro/Micro_Spring2005.htm
4 .John B. Peatman, Design with PIC Microcontrollers, Pearson Education, Asia 2004

8.2 Applied activities [13]	Number of hours	Teaching methods
Installing MPLAB X	2	Exercises
Curiosity High Pin Count (HPC) Development Board	2	
PIC16F18875 Full-Featured 8-bit Microcontroller	2	
Assembly Language	2	
Blink LEDs, Reading a Switch	4	Exercises
Using a Timer Interrupts	4	Exercises
Generate a PWM Signal	4	Exercises
LCD, Using ADC	4	Exercises
USART, I2C/SPI	4	Exercises

Bibliography [14] 1. Rodnay Zaks, Intoduction to microprocessors, Sybex Inc, Berkley CA USA, 1999.
2. Hosein Sabaghian Bidgoli, 8051 Microcontroller, Kashan University, 2005,
3. http://ce.kashanu.ac.ir/sabaghian/micro/Micro_Spring2005.htm
4 .John B. Peatman, Design with PIC Microcontrollers, Pearson Education, Asia 2004

9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

- The content of the discipline is in concordance with the approaches existing in other university centers in the country and abroad as well as with the requirements of the associations and employers interested in the field.

10. Evaluation

Type of activity	**10.1** Evaluation criteria [15]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Gaining knowledge related discipline, understanding technologies / methods presented	Exam	50%
10.5 Applied activities	**S:**		
	L: Level of familiarity with the various topics presented	Continuous assessment, written and oral examination	50%
	P[16]**:**		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [17])			

[12] At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.
[13] Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".
[14] At least one title must belong to the discipline team.
[15] Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)
[16] In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.
[17] It will not explain how the promotion mark is awarded.

- 5 for couse exam and 5 for laboratory

Date of completion	Course coordinator (signature)	Coordinator of applied activities (signature)
15.07.2023		

Head of Department (signature)	Date of approval in the Faculty Council [18]	Dean (signature)
	14.09.2023	

[18] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.