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]			Development project / DD				
2.2 Coordinator (holder) of course activities							
2.3 Coordinator (holder) of applied activities[5]			Papazian Petru				
2.4 Year of study[6]	3	**2.5** Semester	6	**2.6** Type of evaluation	P-D	**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	2 of which:	**3.2** course		**3.3** seminar / laboratory / project	0/0/2
3.1* Total number of fully assisted hours / semester	28 of which:	**3.2*** course		**3.3*** seminar / laboratory / project	0/0/28
3.4 Number of hours partially assisted / week	of which:	**3.5** training		**3.6** hours for diploma project elaboration	
3.4* Total number of hours partially assisted / semester	of which:	**3.5*** training		**3.6*** hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	3,36 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			1
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			1,36
3.7* Number of hours of unassisted activities / semester	47 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			14
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			19
3.8 Total hours / week [9]	5,36				
3.8* Total hours /semester	75				
3.9 Number of credits	3				

4. Prerequisites (where applicable)

4.1 Curriculum	• SP, DIC, PLS, MM, ES, EEC

[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.

4.2 Competencies	• C, CAD-pcb

5. Conditions (where applicable)

5.1 of the course	•
5.2 to conduct practical activities	• Laboratory equipped with workstations, PC, power supply, oscilloscope, signal generator

6. Specific competencies acquired through this discipline

Specific competencies	• Embedded programming, MCU system simulations, MCU system PCB design
Professional competencies ascribed to the specific competencies	• Solving technological problems in the field of applied electronics. • 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	• Adaptation to the new technologies, professional and personal development trough continuous training using printed and electronic format documentation resources in English, Romanian language; dedicated software, etc.

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

7.1 The general objective of the discipline	• The Development Project combining the hardware and software from embedded system with microcontroller including specific PCB layout development aspects, etc.
7.2 Specific objectives	• The development of a complexity application using a microcontroller with internal flash memory and ISP/ICP programming starting from specifications, follow the hardware and software development phases, PCB and layout design, populate the PCB with electronic component (practical implementation), hardware and software testing and documentation preparation. Teamwork, meeting deadlines, communication are also monitored.

8. Content [10]

8.1 Course	Number of hours	Teaching methods [11]

[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.).

Bibliography [12]		
8.2 Applied activities [13]	Number of hours	Teaching methods
1.Theme presentation, generalities, Team building, choice the Microcontroller – imposed the design constraints, details etc.	2	Face to face discussions
2. Hardware block diagram, detail schematic design, bill of materials, PCB design including MCU critical aspects, ISP/ICP connector, logic diagrams, top-down design, etc.	10	
3. Software development: use logic diagrams, up-down design, C or assembler code, troubleshooting techniques, hardware scheme adaptation (simplification) for hardware and software simulations, etc.	12	
4. Software debugging, hardware schematic/ simulations corrections are possible.	2	
5. Final testing of harware and software functionality.	1	Experiment
6. Final presentation	1	Oral

Bibliography [14]

1. Schildt H., C manual complet, Ed. Teora, Bucureşti, 2002;
2. A.Gontean, Microcontrolerul RISC PIC16F84A, Editura Orizonturi Universitare, 2004;
3. John B. Peatman, Design with PIC Microcontrollers, Pearson Education, Asia 2004;
4. Tim Wilmshurst, Designing Embedded Systems with PIC Microcontrollers, Elsevier books, 2009;
5. Myke Predko, Programming and Customizing the PIC Microcontroller, McGrawHill, 2008;
6. Neil Storey, Electronics: a system approach – 4th edition, Prentice Hall 2009;
7. Hubert Henry Ward, Intermediate C Programming for the PIC Microcontroller: Simplifying Embedded Programming, Apress 2020.

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 project is discussed and agreed by the economic partners Continental, Hella, Huf. Employers require that graduates possess knowledge related to the ability to develop applications for embedded systems.
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10. Evaluation

Type of activity	**10.1** Evaluation criteria [15]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course			
10.5 Applied activities	**S:**		
	L:		
	P[16]**:**		
	Pr: Degree of completion, Hardware design,	Oral	20% 25%

[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.

	Software functionality, Written project		35% 20%
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [17])			
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Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
01.07.2023		

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

[17] It will not explain how the promotion mark is awarded.
[18] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.