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 / COMMUNICATIONS
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]			Electronic Equipment Testing for Telecommunications / DS					
2.2 Coordinator (holder) of course activities			Prof.dr.ing. Radu Vasiu					
2.3 Coordinator (holder) of applied activities[5]			Asist.dr.ing. Cristian Țecu					
2.4 Year of study[6]	IV	**2.5** Semester	7	**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	4 of which:	**3.2** course	2	**3.3** seminar / laboratory / project	0/2/0
3.1* Total number of fully assisted hours / semester	56 of which:	**3.2*** course	28	**3.3*** seminar / laboratory / project	0/28/0
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	4.93 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			1.93
		training seminars / laboratories, homework and papers, portfolios and essays			2
3.7* Number of hours of unassisted activities / semester	69 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			27
		training seminars / laboratories, homework and papers, portfolios and essays			28
3.8 Total hours / week [9]	8.93				
3.8* Total hours /semester	125				
3.9 Number of credits	5				

4. Prerequisites (where applicable)

4.1 Curriculum	• Not the case

4.2 Competencies	• Not the case

5. Conditions (where applicable)

5.1 of the course	• Videoprojector, Internet access
5.2 to conduct practical activities	• Specific laboratory equipment, Internet access

6. Specific competencies acquired through this discipline

Specific competencies	• The design and use of hardware and software applications for testing electronic equipment used in telecommunications • Solving problems specific to the testing of digital electronic equipment • Introduction to the field of design for testability and fault tolerant equipment design
Professional competencies ascribed to the specific competencies	• Use of fundamentals related to devices, circuits, systems, instrumentation and electronic technology • Application of basic methods for signal acquisition and processing. • Application of basic knowledge, concepts and methods regarding the architecture of computing systems, microprocessors, microcontrollers, programming languages and techniques. • Selection, installation, configuration and operation of fixed or mobile telecommunications equipment and equipping a site with usual telecommunications networks. • Solving specific problems of transmission media, circuits and equipment for high frequencies (microwaves and optical) • Design, implementation and service operation of data, voice, video multimedia, based on understanding and applying fundamental concepts in communications and information transmission.
Transversal competencies ascribed to the specific competencies	• Methodical analysis of the problems encountered in the activity, identifying the elements for which there are established solutions, thus ensuring the fulfillment of professional tasks • Defining the activities by stages and assigning them to subordinates with a complete explanation of duties, depending on the hierarchical levels, ensuring the efficient exchange of information and interpersonal communication • Adaptation to new technologies, professional and personal development, through continuous training using printed documentation sources, specialized software and electronic resources in the Romanian language and, at least, in an international language •

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

7.1 The general objective of the discipline	• Providing the basic theoretical understanding of testing techniques at the level of electronic component, equipped board and equipment, as well as familiarizing students with the main methods used in testing the functional performance of the main classes of electronic equipment
7.2 Specific objectives	• Familiarization with the main failure models used in the characterization of electronic components and equipment • Presentation of parametric and functional testing techniques at the level of electronic components • Presentation of test stimulus generation techniques • Presentation of on-line and off-line testing techniques of electronic equipment • Familiarity with the principles of design for testability • Knowledge of the principles of making fault-tolerant equipment

8. Content [10]

8.1 Course	Number of hours	Teaching methods [11]
The place of testing in the production process	2	The provision of all educational materials through the UPT Virtual Campus before
Failure models for digital electronic circuits	2	
Testing digital integrated circuit capsules	4	
Board level testing equipped	4	

Generating test sequences for combinational logic circuits	6	the course, the use of ppt slides in the course, the interspersing of interactive question and answer sessions based on the materials provided in advance as well as application sessions.
Equipment for self-testing. Signature Analyzer	2	
Testing of digital telecommunications networks	2	
Faults location in telecommunication cables	2	
Principles of design for testability	2	
The principles of making fault-tolerant equipment	2	

Bibliography [12]   Radu Vasiu, *Testarea echipamentelor electronice*, Ed. Orizonturi Universitare, Timișoara, 2001

D. Pitică, M. Radu, *Elemente de testare pentru sisteme electronice*, Ed. Albastră, Cluj-Napoca, 2001

B. Abramovici, *Digital Systems Testing and Testable Design*, IEEE Press, 2003

Parag K. Lala, *An Introduction to Logic Circuit Testing*, Prentice Hall, 2008

8.2 Applied activities [13]	Number of hours	Teaching methods
Functional testing of semiconductor memories		Providing materials through CV-UPT and interactive discussion sessions.
Functional testing of microprocessors and microcontrollers		
Generation of test stimulus vectors by the method of activation of a pathway		
Generation of test stimulus vectors by the Poage method		
Signature Analyzer		
Determination of the bit error rate		
Audio-video equipment testing		
Designing an electronic voter for fault tolerant systems		

Bibliography [14]   Radu Vasiu, *Testarea echipamentelor electronice*, Ed. Orizonturi Universitare, Timișoara, 2001

Mugur Mocofan, Andrei Ternauciuc, *Materiale de laborator TEETc*, postate pe CV-UPT

Parag K. Lala, *Practical Digital Logic Design and Testing*, Prentice Hall, 1996

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 corroborated with the expectations of the specialized companies following the discussions regarding the curricula held in the board of the specialization. Through inter-university agreements, student mobility is carried out, which confirms the international compatibility of the subject content.

10. **Evaluation**

Type of activity	**10.1** Evaluation criteria [15]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Theoretical topics and problems	Exam	60%
10.5 Applied activities	**S:**		
	L: Practical skills	Knowledge verification tests, homework	40%
	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])			
- To advance the discipline, it is necessary to understand the principles of testing at the level of component, equipped board			

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[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.

and equipment, as well as knowledge of the operation mode of the main equipment used for testing (the automatic tester, the logic analyzer and the signature analyzer. The minimum passing grade is 5.

Date of completion	**Course coordinator** **(signature)**	**Coordinator of applied activities** **(signature)**
06.07.2023		

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

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