

SYLLABUS₁

1. Information about the program

1.1 Higher education institution	POLITEHNICA UNIVERSITY TIMISOARA
1.2 Faculty ₂ / Department ₃	ELECTRONICS AND TELECOMMUNICATIONS / APPLIED ELECTRONICS
1.3 Chair	—
1.4 Field of study (name/code ₄)	ELECTRONICS AND TELECOMMUNICATIONS ENGINEERING / L20202010010
1.5 Study cycle	BACHELOR
1.6 Study program (name/code)/Qualification	TELECOMMUNICATIONS TECHNOLOGIES AND SYSTEMS

2. Information about the discipline

2.1 Name of discipline	Programmable Logic Systems						
2.2 Coordinator (holder) of course activities	Lecturer Simion Georgiana, PhD						
2.3 Coordinator (holder) of applied activities ₅	Lecturer Simion Georgiana, PhD						
2.4 Year of study ₆	3	2.5 Semester	6	2.6 Type of evaluation	ED	2.7 Type of discipline	Mandatory

3. Total estimated time (hours / semester of didactic activities)

3.1 No. of hrs. / week	6 , of which:	3.2 course	3	3.3 seminar/laboratory/ project/training	2
3.4 Total no. of hrs. in the education curricula	55 , of which:	3.5 course	27	3.6 applied activities	28
3.7 Distribution of time for individual activities related to the discipline					hrs.
Study using a manual, course materials, bibliography and lecture notes					16
Additional documentation in the library, on specialized electronic platforms and on the field					2
Preparation for seminars / laboratories, homeworks, assignments, portfolios, and essays					12
Tutoring					1
Examinations					3
Other activities					
Total hrs. of individual activities					34
3.8 Total hrs. / semester ₇	90				
3.9 No. of credits	5				

4. Prerequisites (where applicable)

¹ The form corresponds to the Syllabus promoted by OMECTS 5703/18.12.2011 (Annex3).

² The name of the faculty which manages the educational curriculum to which the discipline belongs.

³ The name of the department entrusted with the discipline, and to which the course coordinator / holder belongs.

⁴ Fill in the code provided in GD no. 493/17.07.2013.

⁵ The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

⁶ The year of study to which the discipline is provided in the curriculum.

⁷ It is obtained by summing up the number of hrs. from 3.4 and 3.7.

4.1 Curriculum	<ul style="list-style-type: none"> Digital Integrated Circuits, Applied Computer Programming
4.2 Competencies	<ul style="list-style-type: none"> Hierarchical programming, structure of a digital system

5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> Laptop, video projector, whiteboard
5.2 to conduct practical activities	<ul style="list-style-type: none"> Laboratory with 8 workstands (and 24 places) each one equipped with PC, development boards and dedicated equipment

6. Specific competencies acquired

Professional competencies:	<ul style="list-style-type: none"> C2- Apply basic methods for signal acquisition and signal processing C3- Applying knowledge, concepts and methods to the underlying computing systems architecture, microprocessors, microcontrollers, programming languages and techniques C4-The design and use of hardware and software applications less complex which are specific for applied electronics
Transversal competencies	<ul style="list-style-type: none"> CT1-Analysis of methodological problems encountered in activity, identifying items for which there are dedicated solutions, providing professional tasks

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

7.1 General objective of the discipline	<ul style="list-style-type: none"> This discipline aims to familiarize students with modern programmable logic structures like CPLDs and FPGAs, the main types of programmable elements and their applications
7.2 Specific objectives	<ul style="list-style-type: none"> When graduating the discipline students have skills, knowledge and expertise on FPGA programming and VHDL, parallel and sequential programming

8. Content

8.1 Course	No. of hours	Teaching methods
Brief history of the programmable systems. SPLDs,CPLDs, FPGAs, ASICs	3	Slides, writing on the whiteboard, Q&A
Programming technologies: antifuse, EEPROM, FLASH, RAM	3	Slides, writing on the whiteboard, Q&A
Structure of programmable logic circuits: CLB, LUP, DCM	3	Slides, writing on the whiteboard, Q&A

§ The professional competencies and the transversal competencies will be treated according to the Methodology of OMECTS 5703/18.12.2011. The competencies listed in the National Register of Qualifications in Higher Education [Registrul Național al Calificărilor din Învățământul Superior RNCIS] (http://www.rncis.ro/portal/page?_pageid=117_70218&_dad=portal&_schema=PORTAL) will be used for the field of study from 1.4 and the program of study from 1.6 of this form, involving the discipline.

Schematic and HDL based design flows, DSP and embedded processors design flows	3	Slides, writing on the whiteboard, Q&A
Introduction to VHDL- logic gates, combinational circuits and sequential circuits	6	Slides, writing on the whiteboard, Q&A
Advanced topics in VHDL	6	Slides, writing on the whiteboard, Q&A
High level FPGA programming based on MatLab and LabView	3	Slides, writing on the whiteboard, Q&A
<ol style="list-style-type: none"> 1. Bibliography⁹ John F. Wakerly, Digital Design: Principles and Practices, 4/E, Prentice Hall, 2005. 2. M. Morris Mano , Charles R. Kime, Tom Martin, Logic and Computer Design Fundamentals, Pearson Higher Education, 2014. 3. Peter J. Ashenden, VHDL Tutorial, Elsevier Science 2004 4. Digital Design with CPLDS Applications &VHDL 5. Darrin M. Hanna, Richard E. Haskell, Introduction to Digital Design Using Digilent FPGA Boards— Block Diagram / VHDL Examples, LBE Books, 2009, ISBN 978-0-9801337-6-9. 		
8.2 Applied activities¹⁰	No. of hours	Teaching methods
Presentation of the FPGA based developing boards	2	Hands-On lab
Logic functions implementation in FPGA using schematic capture. Functional test	2	Hands-On lab
Logic functions implementation in FPGA using VHDL. Functional test.	2	Hands-On lab
Implementing Combinational logic circuits in FPGA using VHDL	4	Hands-On lab
Implementing Sequential logic circuits in FPGA using VHDL	4	Hands-On lab
VGA port-display a test image on monitor	4	Hands-On lab
ROM and RAM memories	4	Hands-On lab
FSM-Traffic light	2	Hands-On lab
Programmable frequency dividers	2	Hands-On lab

⁹ At least one title must belong to the department staff teaching the discipline, and at least 3 titles must refer to national and international works relevant for the discipline, and which can be found in the Politehnica University Library.

¹⁰ The types of applied activities are those specified in footnote 5. If the discipline contains several types of applied activities, then these will be written consecutively in the lines of the table below. The type of activity will be written in a distinct line, as „Seminar:“, „Laboratory:“, „Project:“ and/or „Practice/Training:“.

Bibliography ¹¹ 1. G. Simion, *FPGA Programming an Introduction*, Editura Politehnica 2012

2. Darrin M. Hanna, Richard E. Haskell, *Introduction to Digital Design Using Digilent FPGA Boards— Block Diagram / VHDL Examples*, LBE Books, 2009, ISBN 978-0-9801337-6-9.

3. Digilent Nexys2 Board Reference Manual

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 this course was agreed with the representatives of companies like Continental SA and Hella Romania

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Minimum mark is 5	A 2/2.5 h exam with multiple answer question, theoretical subjects and applicative subjects	1/2
10.5 Applied activities	S:		
	L: The arithmetic average of all marks from the laboratory	Marks for the practical implementations and a mark for small project	1/2
	P:		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified)			
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Date of completion

2.05.2016

Course coordinator
(signature)

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Coordinator of applied activities
(signature)

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Head of Department
(signature)

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Date of approval in the Faculty Council¹²

Dean
(signature)

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¹¹ At least one title must belong to the staff teaching the discipline.

¹² Avizarea este precedată de discutarea punctului de vedere al board-ului de care aparține programul de studiu cu privire la fișa disciplinei.