SYLLABUS[1]

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			Digital Integrated Circuits				
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]	2	**2.5** Semester	3	**2.6** Type of evaluation	E	**2.7** Type of discipline	Mandatory

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

3.1 No. of hrs. / week	4 , of which:	**3.2** course	2	**3.3** seminar/laboratory/ project/training	2
3.4 Total no. of hrs. in the education curricula	56 , of which:	**3.5** course	28	**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	4

4. Prerequisites (where applicable)

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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	• Materials Science, Electronic Devices , Electrical Circuits
4.2 Competencies	• Basic measurements skills

5. **Conditions** (where applicable)

5.1 of the course	• Laptop, video projector, whiteboard
5.2 to conduct practical activities	• Laboratory with 9 workstands (and 18 places) each one equipped with PC, DC, SG,OSC, multimeter, breadboard

6. **Specific competencies acquired**

Professional competencies[8]	• 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	• 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	• This discipline aims to familiarize students with the most common digital integrated circuits. It will be study the principles of operation, and the most important applications will be analyzed
7.2 Specific objectives	• When graduating the discipline students have skills, knowledge and expertise on the basic principles of digital electronics, operation of commonly used digital integrated circuits and their main applications.

8. **Content**

8.1 Course	No. of hours	Teaching methods
Numbering Systems, Elements of Boolean Algebra, Logic gates and logic functions	2	Slides, writing on the whiteboard, Q&A
The study of CMOS, HC/HCT, ALS, LV, BiCMOS families- main parameters, schematics and practical applications	4	Slides, writing on the whiteboard, Q&A
Combinational logic circuits: decoders, encoders, multiplexers,	3	Slides, writing on the

8 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 Naţional al Calificărilor din Învăţământul 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.

demultiplexers – general structure, specific types of circuits, schematics and functional tables, applications		whiteboard, Q&A
Combinational logic circuits: comparators, adders, multiplexers, parity generators/detectors, ALU – general structure, specific types of circuits, schematics and functional tables, applications	3	Slides, writing on the whiteboard, Q&A
Latches and Flip-flops: SR, D, JK, T- schematics, waveforms and applications	4	Slides, writing on the whiteboard, Q&A
One shot and oscillators- schematics, waveforms and applications	2	Slides, writing on the whiteboard, Q&A
Sequential logic circuits: shift registers, universal registers-schematics waveforms, applications	3	Slides, writing on the whiteboard, Q&A
Sequential logic circuits: ripple counters and synchronous counters- schematics waveforms, applications	3	Slides, writing on the whiteboard, Q&A
Semiconductor memories: ROM	2	Slides, writing on the whiteboard, Q&A
Semiconductor memories: RAM	2	Slides, writing on the whiteboard, Q&A

1. Bibliography[9] 1. 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. Mureșan T., Gontean A., Băbăiță M., *Circuite Digitale*. *Ediția II revăzută și adăugită*, Ed de Vest, Timișoara, 2007, ISBN 973-36-0269-8.

8.2 Applied activities[10]	No. of hours	Teaching methods
Presentation of the equipment available in the laboratory: multimeter, digital oscilloscope, logic analyzer, signal generator	2	Hands-On lab
Logic function minimization using VK maps and logic functions implementation using logic gates	4	Hands-On lab
CMOS and TTL families: voltage and current measurements, transfer characteristics, propagation time delay measurement	4	Hands-On lab
Decoders, demultiplexers, multiplexers and encoders	4	Hands-On lab
Adders and comparators	2	Hands-On lab
Bistable elements, one shot circuits and oscillators	4	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:".

Registers and shift registers	2	Hands-On lab
Counters and frequency dividers	2	Hands-On lab
ROM and RAM memories	4	Hands-On lab

Bibliography [11] G. Simion, P. Papazian *Digital Integrated Circuits Practical Aspects,* Editura Politehnica 2015

Mircea Ilie B□b□i□□, Circuite integrate digitale. Culegere de probleme, Editura Politehnica Timi□oara, 2012, ISBN 978-606-554-264-4

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	2/3
10.5 Applied activities	**S:**		
	L: The arithmetic average of all marks from the laboratory	Short tests at the beginning of the labs from the theoretical part and marks for the practical implementations	1/3
	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)

Date of approval in the Faculty Council[12]

Dean

(signature)

[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 aparţine programul de studiu cu privire la fişa disciplinei.

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