SYLLABUS

Discipline name	Digital Electronics
Profile	Electronics and Telecommunications Engineering
Specialization	Telecommunications Technologies and Systems
Code	51322109
Course leader	Assistant Professor Mihaela Cirlugea, Ph.D., Mihaela.Cirlugea@bel.utcluj.ro
Collaborators	Assistant Robert Groza, Robert.Groza@bel.utcluj.ro
Department	Basis of Electronics
Faculty	Electronics, Telecommunications and Information Technology

Sem.	Type of discipline	Course	Applications			Course	Applications			Ind. study	TOTAL	Credits	Form of assessment
		[hours/week]				[hours/sem.]							
			S	L	P		S	L	P				
3	**Engineering**	**2**	**1**	**1**	**-**	**28**	**14**	**14**	**-**	**64**	**120**	**5**	**Exam**

Acquired competences :
Acquired skills (what the student is able to do):
After completing the discipline, the students will be able to: - understand the functioning and internal structure of digital circuits; - analyze circuits and their behaviour; - use design programs specific to digital circuits; - deal with various representations of circuit behaviour;
Acquired abilities: (what type of equipment/instruments/software the student is able to handle)
After completing the discipline, the students will be able to: – deal with different design programs depending of the needs of the circuit that has to be tested/designed – easy compute and handle with numbers in 2 and 16 base – synthesize logic problems of various complexity – design, implement and simulate digital circuits on computer and on digital board

Prerequisites (if necessary)
bases of numeration, elements of logic and binary algebra .

A. Course/Lecture (course/lecture titles)	
1	Introduction in the Binary Logic
2	Boolean Algebra. Operations. Properties
3	Combinational Logic Circuits. Logic Gates. Logic Functions.
4	Function Minimization. Karnaugh Maps
5	Multiplexers. Binary Trees
6	Demultiplexers. Decoders.
7	Arithmetic Operations with Logic Circuits
8	Memories and Programmable Logic Arrays Basics
9	Sequential Logic Circuits. Flip-Flops
10	Synchronous and Asynchronous Counters with Flip-Flops
11	Sequential Synchronous Automata with Flip-Flops
12	Synchronous Counters
13	Applications with Counters
14	Sequential Synchronous Automata with Counters

B1. Applications – Laboratory (list of laboratories), **Seminar** (contents), **Project** (project contents)	
1	Boolean Algebra. Karnaugh Maps
2	Applications with Multiplexers
3	Applications with Demultiplexers and Decoders
4	Applications with Flip-Flops (counters, frequency dividers, signal generators)
5	Sequential Synchronous Automata with Flip-Flops
6	Applications with Synchronous Counters (counters, frequency dividers, signal generators)
7	Sequential Synchronous Automata with Counters

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C. Individual study (reference study contents, synthesis materials, projects, applications etc.)						
2 synthesis reports 6 sets of problems (the preparation part in every laboratory) 3 sets of problems (course homework)						
Individual study structure	Course study	Problem solving, laboratory, project	Applications preparation	Examination time	Additional reference study	Total no. of individual study hours
Hours	28	6	18	3	9	64

References (Textbooks, courses, laboratory manual, exercise book)
1. M. Cîrlugea: Notes on Digital Electronics, Course. Applications
2. M. Cîrlugea: Laboratory manual (in progress)
3.V. Nelson, H. Nagle, B. Caroll, J. Irwin: Digital Logic. Circuit Analysis and Design, Prentice Hall, 1995 (Department's library)
4. John M Yarbrough: Digital Logic. Applications and Design, West Publishing Company, 1997 (Department's library)
5. M.D. Ercegovac: Introduction to Digital Systems, Ed. JohnWiley&Sons, 1999 (Department's library)
6. J. M. Rabaey :Digital Integrated Circuits, 2nd edition, John Willey, 2002 (Department's library)
7. Marcovitz: Introduction to Logic Design, McGraw Hill, New York, 2005
8. Morris Mano, Michael Ciletti: Digital Design, Prentice Hall, SUA, 2007

Final evaluation	
Evaluation method	Written exam (E): problem solving (80%) and theoretical subjects (20%).
Mark components	Exam (E: 0…10 points); Laboratory (L: 0…10 points); Homework (H: 0…10 points);
Mark computation	M = 0.6E + 0.2L + 0.2H. Pass if: E≥4 and L≥4 and M≥4.5

Course leader,

Assist. Prof. Mihaela CÎRLUGEA, Ph.D.