

SYLLABUS

Approved,
DEAN
Prof.univ.dr.ing.Gilbert-Rainer GILLICH

1. Program Data

1.1. Institution of Higher Education	Babeş-Bolyai University
1.2. Faculty	Faculty of Engineering
1.3. Department	Department of Engineering Science
1.4. Field of Study	Applied Engineering Sciences
1.5. Course of Study	Bachelor
1.6. Study Programme	Industrial Informatics

2. Discipline Data

2.1. Discipline Name	Analysis and synthesis of digital devices						
2.2. Course Coordinator	prof.univ.dr.ing. Răduca Eugen						
2.3.1. Seminary Coordinator							
2.3.2. Laboratory Coordinator	prof.univ.dr.ing. Răduca Eugen						
2.3.3. Project Coordinator	-						
2.4. Year of Study	I	2.5. Semester	II	2.6. Evaluation Time	E	2.7. Discipline Regime	Cmp.

3. Estimated Total Time (hours per semester of teaching activities)

3.1. Number of Hours per Week	4	from which: 3.2. Course	2	3.3. seminary&laboratory	2
3.4. Total Hours from the Curriculum Plan	56	from which: 3.5. Course	28	3.6. seminary&laboratory	28
Time Fund Distribution - hours					94
Study of Handbook, Course Materials, Bibliography & Notes					42
Additional Documentation in Library, on Special E-learning Platforms & in the Field					25
Preparation of seminars/laboratories/ projects, topics, reports, portfolios & essays					21
Mentoring					2
Examination					2
Other Activities					2
3.7. Total individual study hours	94				
3.8. Total Hours per Semester	150				
3.9. Number of Credits	5				

4. Pre-condition (where is the case)

4.1. of Curriculum	• Mathematics, Elementary Computer Science
4.2. of Competences	• Use of PC, Digital

5. Condition (where is the case)

5.1. of Course Progress	• Video projector, PC, tablet, chalk or online platform (as appropriate)
5.2.1. of Seminary Progress	•
5.2.2. of Laboratory Progress	• Workstation, application software
5.2.3. of Project Progress	•

6. Acquired Specific Competences

Professional Competences	CT1 - Application and adequacy of specialized knowledge of mathematics, physics, computer science in the field of applied engineering sciences CT2 - Operating with specialized concepts in the field of computer technology and information technology CT3 - Modeling and identification of automatic system elements in the control structures of industrial installations
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Transversal Competences	<p>CT1 - Identify the objectives to be achieved, the available resources, the conditions for their completion, the work stages, the related deadlines and the related risks.</p> <p>CT2 - Identify roles and responsibilities in a multidisciplinary team and apply effective relationship and work techniques within the team.</p>
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7. Discipline Objectives (coming out from the Checklist of Acquired Specific Competences)

7.1. General Objective of Discipline	To consolidate the theoretical basis acquired by students in other disciplines such as: mathematics, physics and logical thinking
7.2. Specific Objectives	To present theoretically and practically to the students the bases for the analysis, synthesis and operation of the main categories of elementary digital electronic circuits

8. Content

8.1. Course	Teaching methods	Observation
1. BASIC NOTIONS OF NUMERICAL TECHNIQUE. Binary codes and numbering systems.	Lecture, graphic materials, problematic dialogue	2 hours
2. NOTIONS ABOUT LOGICAL FUNCTIONS Logical function: definition and representation. Basic laws of logical functions. Canonical functions Incomplete functions.	Lecture, graphic materials, problematic dialogue	4 hours
3. MINIMIZING LOGICAL FUNCTIONS Minimizing logical functions by the method of Veitch Karnaugh diagrams. Minimize logical functions by the Quine-MC-Kluskey method	Lecture, graphic materials, problematic dialogue	4 hours
4. ANALYSIS AND SYNTHESIS OF COMBINATIONAL LOGIC CIRCUITS Algebra of logic circuits; Logical gates. Multiplexers. Demultiplexers Encoders Decoders. Digital comparator. Adders. Code converters.	Lecture, graphic materials, problematic dialogue	5 hours
5. ANALYSIS AND SYNTHESIS OF SEQUENTIAL LOGIC CIRCUITS Generalities; classification Flip flops: RS, D, T, JK. Asynchronous and synchronous counters. Serial and parallel travel registers.	Lecture, graphic materials, problematic dialogue	6 hours
6. DEDICATED SYNTHESIS OF LOGIC CIRCUITS. Synthesis with relays. Synthesis with logical gates. Synthesis with bistable circuits. Synthesis with counters and multiplexers	Lecture, graphic materials, problematic dialogue	5 hours
7. STATUS MACHINES. Defining. Construction. Examples	Lecture, graphic materials, problematic dialogue	2 hours
Bibliography 1. E. Răduca - Course notes 2. E. Răduca, M Răduca, D. Ungureanu-Anghel - Digital Circuits, Ed. Eftimie Murgu Resita, 2010 3. K. Randy, B. Gaetans - Contemporary logic design, Pearson Education International, New Jersey, 2005 4. P. Naslin - Logical circuits and sequential automations E.T. Bucharest, 1967 translation from lb.franzeza		
8.2.1. Seminary	Teaching methods	Observation
8.2.2. Laboratory	Teaching methods	Observation
1. Labor protection training, presentation of the topic and the laboratory	Theme, dialogue, conclusions	2 hours / Hybrid
2. Numbering systems in digital circuits	Verification of the topic, dialogue, experimentation / simulation of conclusions	4 hours / Hybrid
3. Study of the minimization of logical functions by the method of Veitch Karnaugh diagrams and by the Quine-MC-Kluskey method	Verification of the topic, dialogue, experimentation / simulation of conclusions	4 hours / Hybrid
4. The study of logical gates SI, OR, NO and their combinations	Verification of the topic,	4 hours / Hybrid

	dialogue, experimentation / simulation of conclusions	
5. Study of multiplexers and demultiplexers	Verification of the topic, dialogue, experimentation / simulation of conclusions	2 hours / Hybrid
6. Study of encoders and decoders	Verification of the topic, dialogue, experimentation / simulation of conclusions	2 hours / Hybrid
7. Study of bistable circuits: RS, JK, D, T	Verification of the topic, dialogue, experimentation / simulation of conclusions	2 hours / Hybrid
8. Study of counters and registers	Verification of the topic, dialogue, experimentation / simulation of conclusions	2 hours / Hybrid
9. Synthesis of logic circuits with combinational and sequential circuits	Verification of the topic, dialogue, experimentation / simulation of conclusions	4 hours / Hybrid
10. Recoveries. Final discussions. Completion of laboratory activity.	Dialogue, test, note	2 hours / Hybrid
Bibliography 1. E. Răduca - Laboratory notes 2. E. Răduca, M Răduca, D. Ungureanu-Anghel - Digital Circuits, Ed. Eftimie Murgu Resita, 2010 3. K. Randy, B. Gaetans - Contemporary logic design, Pearson Education International, New Jersey, 2005 4. P. Naslin - Logical circuits and sequential automations E.T. Bucharest, 1967 translation from lb.franceza		
8.2.3. Project:-	Teaching methods	Observation

9. Corroborating Discipline's Contents with the Expectation of the Epistemic Community Representatives, the Professional Associations and the Employers' Representatives from the Programme Corresponding Field

- They have been established with the main employers by previous discussions at the study programme substantiation.

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Weight from the final grade
10.4. Course	Debates participation	Number of interventions	5 %
	Acquired knowledge level	Exam (oral)	70 %
10.5.1. Seminary	Activity / implication	Interventions	
	Gained competence level	Interactive	
10.5.2. Laboratory	Activity / implication	Interventions	10 %
	Gained competence level in practice	Interactive	15 %
10.5.3. Project	Readiness in phrasing the project stages		
	Project quality		
10.6. Performance Minimum Standard			
<ul style="list-style-type: none"> • Promoting application activities; • Promoting grade 5 examination 			

Completion Date

May.2022

Course Coordinator's Signature

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Laboratory Coordinator's Signature

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Department Endorsement Date

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Chief of Department Signature

Ș.l.dr.fiz. Cornel Hațiegan

