



DISCIPLINE ACADEMIC SHEET
ACADEMIC YEAR 2025 – 2026

1. PROGRAMME DATA

1.1. Higher Education Institution	UNIVERSITY OF CRAIOVA
1.2. Faculty	Automation, Computers and Electronics
1.3. Department	Computers and Information Technology
1.4. Field of Study	Computers and Information Technology
1.5. Study level	L(License / Undergraduate)
1.6. Organizational form	IF
1.7. Study Program (name/code) /Qualification	Computers / L2060101010

2. DISCIPLINE DATA

2.1 Discipline Name	Introduction to Quantum Computing and Communications						
2.2 Course Activities Holder	Lemeni Ioan						
2.3. Practical Activities Holder	Lemeni Ioan						
2.4. Study Year	4	2.5. Semester	1	2.6. Evaluation type	E	2.7. Discipline regime	DOP

3. ESTIMATED TOTAL TIME (hours per semester of teaching activities)

3.1. Number of hours per week	4	in which: 3.2 course	2	3.3. sem./lab./pr.	2
3.4. Total hours of curriculum	56	in which: 3.5 course	28	3.6. sem./lab./pr.	28
3.7. Time distribution - hours/week					hours
Study after manual, course support, bibliography and notes					28
Additional documentation in library, on specialized electronic platforms and field					14
Training seminars / labs, homework, portfolios and essays					14
Tutorial					-
Examinations					5
Other activities.....					8
Total hours per individual activities					69
3.8. Total hours per semester					125
3.9. Number of credits					5

4. PRECONDITIONS (where appropriate)

4.1. of curriculum	• •
4.2. of competence	• •

5. CONDITIONS (where appropriate)

5.1. of the course	• •
5.2. of seminar/ laboratory/project	• •

6. COURSE OBJECTIVES – expected learning outcomes that are supported by completing and passing the course

Knowledge	The student/graduate: 1. The student/graduate describes, identifies, summarizes elementary concepts and methods regarding systems in general and digital systems in particular and the way they are applied to concrete problems. 2. The student/graduate describes, identifies, summarizes elementary concepts and methods regarding hardware description languages, programming environments and the way they are applied to concrete problems.
Skills (Abilities)	The student/graduate selects and applies evaluation criteria, principles and methods for the identification, modeling, simulation and experimentation of phenomena and processes in the field of quantum computers and networks.
Responsibility and autonomy	The student/graduate selects and analyzes the bibliographic sources specific to the field. The student/graduate demonstrates learning autonomy on topics specific to the field.

7. CONTENT

7.1. Course	The method of implementation	Teaching methods	Allocated time (hours)
1. 1. VLSI circuits: ASIC vs. FPGA. Hardware description languages	Online sincron (săptămâna 1)	Participative lecture	2
2. 2. Classes and data types in VHDL.	Online sincron (săptămâna 2, 3)	Participative lecture	3
3. 3. Operators in VHDL	Online sincron (săptămâna 3, 4)	Participative lecture	3
4. 4. Arithmetic packages	Online sincron (săptămâna 5)	Participative lecture	2
5. 5. The simulator.	Online sincron (săptămâna 6)	Participative lecture	2
6. 6. Concurrent statements.	face to face	Participative lecture	2
7. 7. The "process" statement and sequential statements.	face to face	Participative lecture	3
8. 8. Describing flip-flops.	face to face	Participative lecture	3
9. 9. Describing registers and counters.	face to face	Participative lecture	2
10. 10. Describing Mealy sequential machines.	face to face	Participative lecture	2
11. 11. Modeling	face to face	Participative lecture	4

sequential machines with datapath			
Bibliography:			
1. 1. Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999 2. Jasinski R. – Effective Coding with VHDL - Principles and Best Practice, The MIT Press, 2016 3. Perry D. – Vhdl Programming By Example, McGraw-Hill, 2002 4. Skahill K. – VHDL for programmable logic, Addison-Wesley, 1996			
2.			

7.2. Seminar/laboratory/project	The method of implementation	Teaching methods	Allocated time (hours)
1. 1. Installing Xilinx ISE and Modelsim	Online sincron (săptămâna 1)	Practice and discussions	2
2. 2. Review 1 - Entity, Architecture and Signal	Online sincron (săptămâna 2)	Practice and discussions	2
3. 3. Review 2 - Selected Signal Assignment	Online sincron (săptămâna 3)	Practice and discussions	2
4. 4. Review 3 - Conditional Signal Assignment – Priority encoders (COP)	face to face	Practice and discussions	2
5. 5. Synthesis, implementation, generation of the programming file and testing on the Spartan 3 board of a COP8	face to face	Practice and discussions	2
6. 6. Simulating a COP8 with Modelsim	face to face	Practice and discussions	2
7. 7. Arithmetic packages – Adder-subtractor for numbers represented in direct code.	face to face	Practice and discussions	2
8. 8. The "process" statement and sequential statements – Priority encoder with "Generic"	face to face	Practice and discussions	2
9. 9. Multiplexed display.	face to face	Practice and discussions	2
10. 10. Digital clock	face to face	Practice and discussions	4
11. 11. Sequential machines	face to face	Practice and discussions	4
12. 12. Make-up session	face to face	Practice and discussions	2
Bibliography:			
1. 1. Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999 2. Jasinski R. – Effective Coding with VHDL - Principles and Best Practice, The MIT Press, 2016 3. Perry D. – Vhdl Programming By Example, McGraw-Hill, 2002			

4. Skahill K. – VHDL for programmable logic, Addison-Wesley, 1996
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8. Correlating the content of the discipline with the expectations of representatives from the epistemic community, professional associations and representative employers in the field related to the program

The content of the discipline is adapted to and satisfies the requirements imposed by the labour market, being agreed with social partners, professional associations and employers in the field related to the bachelor's program.

9. EVALUATION

Activity Type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Final mark weight
9.4. Course	--	-	-
9.5. Seminar/laboratory/project	Continuous appreciation of independent work	Each laboratory work involves solving several tasks. Solving the tasks is mandatory and must be completed in a single laboratory session (2 hours). If a team fails to finish the mandatory tasks, the laboratory work will be redone. Only one laboratory work can be redone.	0%
9.6. Minimum standard of performance			
Exam: written test. The condition for participating in the written test is solving the mandatory tasks in each laboratory work. Evaluation: The final grade is calculated with the formula: final grade = min(10, round(S+B)) where S is the grade of the written test and B is the bonus obtained in the laboratory. S must be greater than or equal to 4.5.			

Date of Completion	Signature of the Course Activities Holder,	Signature of the Practical Activities Holder,
23.08.2025	Lemeni Ioan	Lemeni Ioan

Date of Approval in the Department	Signature of the Department Director,
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25.08.2025	Ş.l.dr.ing. Nicolae ENESCU
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Date of Approval in the Faculty	Signature of the Dean,
	Prof.dr.ing. Dorin ŞENDRESCU