NAME OF THE COURSE	Computer Architecture Practicum					
Code	PMIC12	Year of study	UGU-2			
Course teacher	prof.dr. sc. Andrina Granić	Credits (ECTS)	4,0			
Associate teachers	dr. sc. Goran Zaharija	Type of instruction (number of hours)	L	S	E	F
					45	
Status of the course		Percentage of application of e-learning	20%			

COURSE DESCRIPTION	
Course objectives	Learn about digital circuits and systems and their application in computer architecture. Familiarize with design and analysis of digital circuits used for building complex logical functions in the CPU. Analyse three main CPU stages - fetching, decoding and execution. Design and build a simple microprocessor using simulation environment.
Course enrolment requirements and entry competences required for the course	Conditions: Passed the course - Introduction to Computer Science Enrolled in course - Computer Architecture Competencies: basic knowledge of computer science.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. Design and analyse basic logic circuits. 2. Identify different transistor types and their usage in building logic circuits. 3. Classify complex combinational and sequential logic circuits. 4. Identify and classify standard and programmable logic circuits. 5. Design digital circuits implementing basic logic functions. 6. Compare basic implementations of digital circuits. 7. Calculate the performance of digital system. 8. Identify main CPU parts and describe their functions. 9. Develop given project task. 10. Present and describe final project.
Course content broken down in detail by weekly class schedule (syllabus)	Laboratory exercise plan (15 terms): 1. Course introduction. Introduction to the simulation tool – Logisim. 2. Implementing logic function. Boolean algebra. Integrated circuits. Circuit delays. Circuit transformations. 3. Function minimization (K-tables): Mnterm and Maxterm. Multi-layered circuits. 4. Combinational circuits: decoder, MUX, DEMUX, memory, priority coder. 5. Arithmetical circuits. 6. Programmable circuits. 7. Flip-flop: basics. Different types, triggering. 8. Standard sequential modules. 9. Midterm 1 10. Comparison of different microprocessor types. Analysis of chosen MP type. 11. Designing the processor ALU. 12. Main control and processor bus. Overview of control signals. Processor datapath. 13. Microprocessor memory modules - design and implementation (RAM and ROM). 14. Combining the separate CPU parts in one circuit. Testing the model. 15. Midterm 2

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<tr><td></td><td>Project task:
1. Overview of current trends in computer architecture. (2h)
2. Defining the project task. (2h)
3. Project task structure. (1h)
4. Project development and documentation. (8h)
5. Project presentation and grading, discussion. (2h)</td></tr>
<tr><td>Format of instruction</td><td>☐ lectures
☐ seminars and workshops
☐ exercises
☐ on line in entirety
☒ partial e-learning
☐ field work
☒ independent assignments
☐ multimedia
☒ laboratory
☐ work with mentor
☐ homework assignments</td></tr>
<tr><td>Student responsibilities</td><td>Lecture and laboratory attendance, active participation in course activities, homework and project realization, final exam.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th></tr>
<tr><td>Class attendance</td><td>1</td><td>Research</td><td></td><td>Experimental work</td><td></td></tr>
<tr><td>Oral exam</td><td></td><td>Report</td><td></td><td>Homework assignments</td><td></td></tr>
<tr><td>Seminar essay</td><td></td><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Tests</td><td>1</td><td>Practical training</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
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<tr><td>Grading and evaluating student work in class and at the final exam</td><td>Midterms (33% + 33%)
Practical exam (66%). Passed midterms replace the practical exam.
Project task (34%)</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>U. Peruško, Digitalna elektronika, logičko i električko projektiranje, III. prošireno izdanje, Školska knjiga - Zagreb, 1996</td><td>10</td><td></td></tr>
<tr><td>S. Ribarić: Građa računala: arhitektura i organizacija računarskih sustava, Algebra, Zagreb, 2011.</td><td>15</td><td></td></tr>
<tr><td>J. Nakić, G. Zaharija: Course materials for computer architecture practicum</td><td>0</td><td>on-line</td></tr>
</table>
</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>U. Peruško, V. Glavinić: Digitalni sustavi, Školska knjiga, 2005
A. S. Tanenbaum: Structured Computer Organization. Prentice-Hall International, Third Edition, 1990</td></tr>
<tr><td>Quality assurance methods that ensure the</td><td>Student discussion, anonymous student evaluation questionnaire, student success rate, self-assessment</td></tr>
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acquisition of exit competences	
Other (as the proposer wishes to add)	