

Syllabus of the educational discipline

«COMPUTER ARCHITECTURE»

Cycle of Higher Education	<i>First cycle of higher education (Bachelor's degree)</i>
Field of Study	<i>12 Information Technologies</i>
Specialty	<i>123 Computer engineering</i>
Educational program	<i>Computer systems and networks</i>
Discipline status	<i>Normative</i>
Teaching language	<i>English</i>
Year of studies, semester	<i>3,4 year (6 semester, 7 semester)</i>
Number of credits ECTS	<i>8 credits</i>
Distribution by types of trainings and hours of study	<i>Lectures, Laboratory studies, Practice studies, Independent training</i>
Form of final assessment	<i>Exam, exam</i>
Teacher	<i>Voitovich B. V., assistant lecturer of department of computer systems and networks</i>
Teacher's contacts	<i>bohdan.voitovych@uzhnu.edu.ua</i>
Course Schedule	<i>According to the timetable</i>
<p><i>The purpose of the discipline is to familiarize with the architecture of modern computers on the example of common RISC architectures, technical aspects of the organization of the computing process, the design of the information path and memory subsystems.</i></p> <p><i>As a result of studying the discipline the student must:</i></p> <p><i>know:</i></p> <ul style="list-style-type: none"> <i>- features of RISC computer architecture</i> <i>- assembly language and machine language of common RISC architectures</i> <i>- understanding the stages of executing machine commands</i> <p><i>be able to:</i></p> <ul style="list-style-type: none"> <i>- design the information path of the processor and the cache and virtual memory subsystems</i> <i>- analyze and optimally select the architecture of the processor and memory subsystem for given parameters</i> 	
<p>Prerequisites for learning</p> <p>Programming, System Programming, Organization and functioning of computers, Computer logic, Theory of information and coding</p>	
<p>Content of the educational discipline</p> <p>Topic 1. MIPS architecture</p> <p>Topic 2. Machine language MIPS</p> <p>Topic 3. Instructions(commands)</p> <p>Topic 4. Memory card</p> <p>Topic 5. The concept of microarchitecture</p> <p>Topic 6. Designing the information path and control device for single-cycle processors</p> <p>Topic 7. Designing the information path and control device for multi-cycle processors</p> <p>Topic 8. Parallelism</p> <p>Topic 9. Designing the information path and control device for pipeline processors</p> <p>Topic 10. Special situation handling.</p> <p>Topic 11. Improved microarchitectures</p> <p>Topic 12. Comparison of architectures MIPS and x86-64</p> <p>Topic 13. Hierarchical computer memory. Basic concepts</p> <p>Topic 14. Cache memory</p> <p>Topic 15. Virtual memory</p> <p>Topic 16. I/O in personal computers</p> <p>Topic 17. I/O in built-in systems</p> <p>Topic 18. RISC-V</p> <p>Topic 19. ARM</p>	

Course page on the Moodle platform (personal training system)		<i>Syllabus of the educational discipline, hyperlinks to electronic publications of the discipline, recommended literature, students' attendance, lecture materials, presentations, questions for self-control, methodical materials for laboratory works, tests, tasks for checking students' knowledge. https://moodle.uzhnu.edu.ua</i>	
Recommended literature			
<ol style="list-style-type: none"> 1. <i>David Money Harris Digital Design and Computer Architecture. - Morgan Kaufmann; 2nd edition. 2012. - 720p.</i> 2. <i>Sarah L. Harris, David Harris Digital Design and Computer Architecture, RISC-V Edition: RISC-V Edition. - Morgan Kaufmann; 1st edition, 2021. - 592p.</i> 3. <i>Jim Ledin Modern Computer Architecture and Organization: Learn x86, ARM, and RISC-V architectures and the design of smartphones, PCs, and cloud servers. - Packt Publishing; Illustrated edition, 2020. - 560p.</i> 			
Assessment system of learning outcomes			
<i>The ECTS grade that a student receives after studying a credit module of a discipline is determined according to the student's rating. A student's credit module rating consists of the points the student receives during the semester for the following types of work:</i>			
<ol style="list-style-type: none"> 1. <i>Modular control work (MCW) duration of 2 acad. hours each. The maximum number of points for the MCW is 40 points.</i> 2. <i>Performance of practice and laboratory works(maximum number of points - 50).</i> 			
<i>Scores on individual and independent work of students are awarded for: preparation of essays, modernization of tasks, creative approach to task performance, performance of tasks to improve didactic materials on the discipline: 0-10 points for each module.</i>			
ECTS and national grading scale			
Mark scale	ECTS	Exam	Test
90 - 100	A	Excellent	Satisfied
82 - 89	B	Good	
74 - 81	C		
64 - 73	D	Satisfactory	
60 - 63	E		
35 - 59	FX	“Unsatisfactory” with possibility to pass the exam again	“Not satisfied” with possibility to pass the exam again
1 - 34	F	“Unsatisfactory” with obligatory repeated study of the discipline	“Not satisfied” with obligatory repeated study of the discipline