

Study program: Computer and software engineering, Mechatronics, Information technologies, Engineering management				
Type and level of studies: Undergraduate academic studies				
Course unit: Computer Systems Organization				
Teacher in charge: Uroš Pešović, teaching assistant Dejan Vujičić				
Language of instruction: English				
ECTS: 6				
Prerequisites: -				
Semester: Winter semester				
<i>Course unit objective:</i> Familiarisation with the organization of computers based on the von Neumann and Harvard architectures. Learning the functional units of computers and their characteristics; Logical design of the central processor in accordance with the architecture specification; identifying the relationship between hardware and computer system software: virtual machine, compiler and operating system.				
<i>Learning outcomes of Course unit</i> The student knows how to explain the basic organization of a computer system; designs arithmetic/logic unit, registers, data path and controller unit of computer based on hardwired logic; writes programs in assembly language for designed computer architecture. He designed an assembler, and a translator for a high-level object-oriented language. Understands the role and design process of system software;				
Course unit contents <i>Theoretical teaching</i> Basic organization of computer systems. Boolean logic and design of arithmetic/logic unit, sequential logic and design of registers and memory. Design of computer instruction set architecture. Design of processor data-path and hardwired logic based control unit. Program and data memory. Memory-mapped input/output devices. Design of assembler, virtual machine and compiler for object oriented language. <i>Practical teaching</i> Practical application and verification of acquired knowledge through solving tasks using hardware description language and writing assembler and object oriented programs and execution on simulator.				
Literature [1] Noam Nissan, Shimon Schocken, The Elements of Computing Systems: Building a Modern Computer from First Principles, MIT Press, Second Edition, 2021, ISBN: 9780262539807 [2] David Patterson, John Hennessy, Computer Organization and Design - The Hardware/Software Interface: RISC-V Edition, Morgan Kaufmann; 1st edition, 2017, ISBN: 978-0128122754 [3] Kip Irvine, Assembly language for x86 processors, 7th Edition, Pearson, 2014, ISBN: 978-0-13-376940-1				
Number of active teaching hours				Other classes
Lectures: 2	Practice:2	Other forms of classes:	Independent work:	
Teaching methods: consultations, independent work				
Examination methods (maximum 100 points)				
Exam prerequisites		No. of points:	Final exam	No. of points:
Student's activity during lectures		0	oral examination	20
Practical classes		10	written examination	30
Seminars/homework		40		
Project				
Grading system				
Grade	No. of points		Description	
10	91-100		Excellent	
9	81-90		Exceptionally good	
8	71-80		Very good	
7	61-70		Good	
6	51-60		Passing	
5	less than 50		Failing	