

## 关。GDAŃSK UNIVERSITY 创 OF TECHNOLOGY

## Subject card

Subject name and code	Computer Architecture, PG_00047819							
Field of study	Informatics							
Date of commencement of studies	October 2020		Academic year of realisation of subject		2021/2022			
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study			
Mode of study	Part-time studies		Mode of delivery			at the university		
Year of study	2		Language of instruction		Polish			
Semester of study	3		ECTS credits		4.0			
Learning profile	general academic profile		Assessment form		exam			
Conducting unit	Department of Computer Architecture -> Faculty of Electronics, Telecommunications and Informatics							
Name and surname of lecturer (lecturers)	Subject supervisor		mgr inż. Tymoteusz Cejrowski					
	Teachers	mgr inž. Tymoteusz Cejrowski						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0		0.0	30
	E-learning hours included: 0.0							
	Adresy na platformie eNauczanie:							
Learning activity and number of study hours	Learning activity	Participation in classes include plan	n didactic led in study	Participation in consultation hours		Self-study		SUM
	Number of study hours	30		4.0		66.0		100
Subject objectives	The aim of the course is to provide knowledge of the concepts related to the computer architecture and knowledge of the basic mechanisms of processors at the ISA level, and to present the latest trends in the construction of the processors.							

Learning outcomes	Course outcome	Subject outcome	Method of verification		
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Student understands and integrates low-level system subprograms requiring the use of different standards, communication methods or character coding.	[SU1] Assessment of task fulfilment		
	[K6_U41] can produce, test or evaluate software using modern programming platforms, tools, languages and paradigms of different levels, as well as use software packages supporting scientific and research processes as well as business decision- making processes and teamwork	Student develops software at the processor level, runs and tests own programs.	[SU1] Assessment of task fulfilment		
	[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Students knows computer architecture, principles of operating memory management and addressing techniques, program assembly technique, operation of interrupt systems and cooperation with external systems.	[SW1] Assessment of factual knowledge		
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	The student is able to integrate software modules in high and low level languages.	[SU1] Assessment of task fulfilment		
Subject contents	<ol> <li>Introduction and principles of course completion, literature.</li> <li>General organization of the computer according to von Neumann.</li> <li>x86 architecture elements at the register level: general purpose registers, tags, real mode and protected mode.</li> <li>Physical and virtual memory, addressing memory, the problem of bytes order (little/big endian).</li> <li>Development of the x86 architecture.</li> <li>Processor software model, command cycle, instruction classification according to how it affects the instruction pointer (command counter).</li> <li>Rules of programming at the level of processor commands, functions of typical commands.</li> <li>Addressing modes.</li> <li>Programming elements in assembler: instruction mnemonics, source line formats, variables and labels, directives.</li> <li>Stack operations: call and return from subprogram (ret), transfer of parameters to subprogram.</li> <li>Hardware support for stack-based parameter transfer, stack frame.</li> <li>Mixed programming, ABI interface, typical function call standards (Pascal, C, StdCall).</li> <li>System services and their calling, API interface, interrupt descriptor board in x86 architecture.</li> <li>Adtressing is ASOL, Windows, ISO, Unicode, UTF-8, UTF-16.</li> <li>Arithmetic operations, identification of excess.</li> <li>Single bit operations, logical and cyclic shifts (rotations).</li> <li>Basic concepts for controlling external devices Controlling devices via co-addressable memory area or I/ O address space.</li> <li>Hardware interrupts and their operation, interrupt priorities, masked and unmasked interrupts.</li> <li>CPU exceptions, hardware and software interrupts.</li> <li>FDa transmission by DMA.</li> <li>Floating point number formats (IEEE 754 standard).</li> <li>Arithmetic coprocessor, calculation examples.</li> <li>Selection of calculation options, state register and coprocessor control register.</li> <li>Computer memory hi</li></ol>				
Prerequisites and co-requisites			· · · · · · · · · · · · · · · · · · ·		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade	
	Practical exercises	0.0%	50.0%	
	Exam	0.0%	50.0%	
Recommended reading	Basic literature Supplementary literature	Null L., Lobur J.: Struktura organizacyjna i architektura systemów komputerowych. Wyd. Helion 2004. Tanenbaum A.S.: Strukturalna organizacja systemów komputerowych, wyd. Helion Lewis D.: Między asemblerem a językiem C, wyd. RM John L. Hennessy, David A. Patterson, "Computer Architecture: A Quantitative Approach", 2014 Morgan Kaufmann No requirements		
	eResources addresses	es addresses		
Example issues/ example questions/ tasks being completed				
Work placement	Not applicable			