



Subject card

Subject name and code	Computer System Organization, PG_00068270						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2028/2029	
Education level	first-cycle studies	Subject group				Optional subject group Subject group related to scientific research in the field of study	
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	3	Language of instruction				Polish	
Semester of study	5	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Department of Automatic Control -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Raczyński				
	Teachers		dr inż. Paweł Raczyński				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	30	2.0		18.0		50
Subject objectives	The main aim of the subject is to gain knowledge about the most common computer systems organization and basic knowledge of computer system components and principles of their operation.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_W03] knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		Knows and is able to use various computer system architectures and their functional components in practice, with particular emphasis on creating interfaces connecting the control computer with the control object.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge	
	[K6_W10] knows and understands, to an advanced extent, the parameters, functions, and methods of analysis, design, and optimization of electronic circuits and systems, the definitions of error and measurement uncertainty, measurement methods, including time, frequency, and phase measurements, the properties of converters, and methods of digital signal processing, as well as the basic processes occurring in the life cycle of technical devices, objects, and systems, and methods of supporting processes and functions, specific to the field of study		He understands and can design computers with various architectures. He can design dedicated systems that interface computers with measurement and control systems. He understands the principles of real-time system design and understands the need for and methods of code optimization in such systems.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge	

Subject contents	<p>Course content – lecture</p> <ol style="list-style-type: none"> 1. Intel x86 processor architecture, general-purpose registers, arithmetic logic unit, flags. 2. Addressing memory and I/O devices, memory segmentation, addressing modes. 3. Processor program model, instruction cycle. 4. Overview of the instruction list, bit, string, and sequence operations, unconditional and conditional control instructions, trace jumps, stack utilization. 5. Coprocessor, floating-point calculations 6. Processor organization, interface and instruction execution modules, instruction queuing, processor operating modes: real and protected. 7. Interrupt system, vectorization, multi-level support. 8. Typical I/O systems, I/O device support. 9. Parallel and serial communication, hardware support 10. Handling hardware and software interrupts. 11. Interrupt controller, operating modes, and implemented functions. 12. Direct memory access (DMA). 13. CISC and RISC processors. 14. PC-standard computer architecture. 15. Memory Storage, Fixed Disks, Optical Disks, Flash Memory. 16. Interaction with External Devices, Uniform and Separate Addressing. 17. BIOS Organization and Available Functions. 18. User Console, Interaction with Keyboard and Pointing Device, Data Stream Buffering Techniques 19. Real-Time Clock and System Clock. 20. Operating System, Organization, Offered Functions and Services. 21. Von Neumann and Harvard Architecture, Microcontroller Architecture 22. Communication with the External World, Port Organization, Basic and Alternative Port Functions, Read-Modify-Write Operations. 23. Programmable Counters and Their Applications. 24. Typical Interfaces and Mechanisms for Hardware Data Exchange Support. 		
Prerequisites and co-requisites	Basic knowledge of digital techniques and circuits		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	51.0%	100.0%
Recommended reading	Basic literature	<p>A. Pyrchla, B. Danowski, BIOS. Przewodnik, Helion 2007 A. S. Tanenbaum, Strukturalna organizacja systemów komputerowych, Helion 2006 B. Zieliński, Układy mikroprocesorowe. Przykłady rozwiązań, Helion 2002 K. R. Irvine, Asembler dla procesorów Intel vademecum profesjonalisty, Helion 2003 Katalogi, strony WWW i podręczniki firmowe Metzger P. "Anatomia PC", HELION, 2008 N. Noam, S. Shimon Elementy systemów komputerowych. Budowa nowoczesnego komputera od podstaw., WNT 2008 Niederliński A. Mikroprocesory mikrokomputery mikrosystemy. WSiP 1988</p>	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Practical activities within the subject	Not applicable		

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