GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2025	Academic year of realisation of subject	2027/2028
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_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.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
[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.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

<table>
<tr><td>Subject contents</td><td>Course content – lecture
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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of digital techniques and circuits</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Midterm colloquium</td><td>51.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.