GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer Architecture and Operating Systems, PG_00047906						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2025/2026			
Education level	first-cycle studies		Subject group	Obligatory subject group in the field of study			
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	2		Language of instruction	Polish			
Semester of study	3		ECTS credits	2.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of Radiocommunication Systems and Networks -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Wojciech Siwicki					
	Teachers	dr inż. Wojciech Siwicki					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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	Obtaining knowledge about architecture, principles of operation of computers and processors on register level. Gaining knowledge of operating systems principles of action and basic functions Obtaining basic knowledge of processing models.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	Student knows how to change, improve, test and run the created software.	[SU4] Assessment of ability to use methods and tools
[K6_U07] can apply methods of process and function support, specific to the field of study	Student is familiar with both theoretical and practical approach to problem solving.	[SU1] Assessment of task fulfilment
[K6_U08] while identifying and formulating specifications of engineering tasks related to the field of study and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering work n	Student knows computer architecture and processing architecture. Knows how to represent data in the computer. He can explain the operation of the computer. He knows the layered structure of the operating system. Can explain the principles of computer resource management.	[SU2] Assessment of ability to analyse information
[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 on the basis of theoretical and practical knowledge knows how to apply the appropriate technical solution necessary to perform the task entrusted to him.	[SU2] Assessment of ability to analyse information
[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	Student is able to design, write and run its own programs in the MS Visual Studio environment.	[SW1] Assessment of factual knowledge

Subject contents

Von Neumanna computer architecture. Computer architecture on register level. Processor programming model, execution cycle, processor command classification. Assembler programming elements. Data coding. Moving (transportation) commands, address modifications, stack operations. Arithmetic and bit operations, shifting operations, overflow identification. Comparing techniques. Subprogram calling and return, call arguments transfer. Computer memory hierarchy. Multicomputer and multiprocessor systems. Parallel computing, Amdahl law. Modern multicore and multithread processors. Computer systems architecture classification. Processing models. Distributed processing types. Virtual machines. Operating system multilayer model. Operating system tasks and functions. Operating system kernel layer. Process description. Process, memory and file management.

Prerequisites and co-requisites

Basic programming skills

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
colloqium	50.0%	60.0%
labolatory	50.0%	40.0%

Recommended reading

Basic literature

1. Tanenbaum A.S.: Structured Computer Organisation. Prentice Hall 2005.
2. Stallings W.: Computer Organization and Architecture. Prentice Hall 2010.
3. Silberschatz A., Galvin P.: Operating Systems Concepts. John Wiley 2002.

Supplementary literature

1. Null L., Lobur J.: The Essentials of Computer Organization and Architecture. Jones and Barlett Publishers 2006.
2. Dudek A.: How to write viruses. Warszawa wyd. Read Me 1994.
3. Błaszczyk A.: Win32ASM. Assembler at Windows. Gliwice wyd. Helion 2003.

eResources addresses

Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Number representation.Computer instruction cycle. Interrupts and exeptions. Centralized and distributed processing models. Operating system design, tasks, functions.Memory, processor and file management. Software development using MS Visual Studio framework.
Work placement	Not applicable