GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microprocessors And Microcontrollers, PG_00047916		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
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	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	exam
Conducting unit	Department Of Metrology And Optoelectronics -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Grzegorz Lentka	
	Teachers	dr hab. inż. Grzegorz Lentka	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	2.0	33.0	50

Subject objectives

Getting familar with architectures, construction and examples of nowadays microprocessors and microcontrollers

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	Uses layered model of microcontroller, classifies specific properties of microcontrollers.	[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 identifies basic functional components of microprocessor, differentiates between von Neumann and Harvard architectures and compares CISC and RISC processors. Defines microcontroller, microcontrollers families with examples. Identifies peripherals of microcontrollers with examples.	[SW1] Assessment of factual knowledge

Subject contents	1. Microprocessor. History and development of microprocessors. Basic functional components of microprocessor 2. Programming model of microprocessor. Von Neumann and Harvard architectures. 3. Evolution of microprocessors of x86 family. 8, 16, 32, 64bit processors. Extensions of CISC architecture and instruction set 4. RISC microprocessors. Load-store architecture. 5. Performance improvement techniques: pipeline processing, cache memory, multithreading, multicore, parallel processing of instructions and data. 6. Comparison of advanced constructions of microprocessors (ARM, ARM, PowerPC, MIPS, Itanium, SPARC). 7. Microprocessor communication with memories and peripheral devices. Universal and specialized input-output circuits. Interrupt system of microprocessor. External and internal interrupts. Interrupt masking. Interrupt servicing. Direct memory access. DMA controller. 8. Microcontrollers. Architecture and usage. Layered structure of micro-controllers. Microcontrollers families. 9. Specificity of microcontrollers: universal ports, reset circuitry, supervising circuits (BOR, LVD, watchdog), clock oscillator and clock distribution circuits, power saving techniques and special modes. 10. Peripheral circuits of microcontrollers. Timer-counter circuits. 11. Serial communication ports: UART, SPI, I2C, USB. 12. Microcontroller family examples (PIC, AVR, ARM). 13. Description and construction of example microcontroller. 14. Specificity of software development for microcontrollers. 15. Tools for development and evaluation of microcontroller systems.
Prerequisites and co-requisites	No requirements
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Exam	66.0%	100.0%

Recommended reading	Basic literature	1. J. Crisp: Introduction to Microprocessors and Microcontrollers, Newnes 2004 2. S. Furber: ARM System-on-Chip Architecture (2nd Edition), Addison-Wesley Professional 2000
	Supplementary literature	1. A. Sloss, D. Symes, C. Wright: ARM System Developer"s Guide: Designing and Optimizing System Software , Morgan Kaufmann 2004 2. J. Majewski: Programowanie mikrokontrolerów LPC2000 w języku C, pierwsze kroki, BTC 2010 3. L. Bryndza: LPC2000 Mikrokontrolery z rdzeniem ARM, BTC, Warszawa 2007
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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