GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microprocessors and Microcontrollers - laboratory, PG_00048072		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Metrology and Optoelectronics -> Faculty of Electronics, Telecommunications and Informatics		
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	0.0	0.0	30.0	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	Acquisition of the ability to: analyse technical documentation of microprocessors/microcontrollers, use software tools and IDE, prepare, compile and run complex programs for selected microcontrollers, control software and hardware working correctness.

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	Performs testing of hardware and software correctness.	[SU1] Assessment of task fulfilment
[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	Realizes, compiles and debuggs complex program for selected microcontroller.	[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	Uses software tools and IDEs for selected microcontrollers.	[SU4] Assessment of ability to use methods and tools
[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 recognizes hardware tools: stater kits and development boards for selected microcontrolers. Classifies memory types and addressing modes.	[SW1] Assessment of factual knowledge
[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	Develops interrupt service and identification routines. Uses timers to realize time dependencies. Realizes serial communications using hardware communication modules. Services input/output circuits and peripherial devices.	[SU1] Assessment of task fulfilment

Subject contents

1. Hardware tools: starting kits and development boards for selected microcontrollers. 2. Memory types, stack, registers, input/output ports, subprograms, addressing modes. 3. External events handling. Interrupt servicing and identification. 4. Memory access. Memory access registers. Writing and reading memory. 5. Time circuits. Clock interrupts. Code execution time. 6. Serial communication. Programming of serial communication modules. 7. Servicing of I/O circuits and servicing of peripheral devices. 8. Hardware and code execution correctness controlling. 9. Embedded hardware modules supporting programming. 10. Programming tools: assembler, linker, debugger. IDE environments for selected microcontrollers. 11. Development of complex program for selected microcontroller.

Prerequisites and co-requisites

No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Perform all exercises	50.0%	100.0%

Recommended reading

Basic 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
Supplementary 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
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Work placement

Not applicable