

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Microprocessor Engineering, PG_00038098								
Field of study	Automation, Robotics and Control Systems								
Date of commencement of studies	October 2023		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	2		Language of instruction			Polish			
Semester of study	4		ECTS credits			5.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department of Control Engineering -> Faculty of Electrical and Control Engineering								
Name and surname	Subject supervisor		dr inż. Andrzej Kopczyński						
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
	Number of study hours	30.0	0.0	30.0	0.0		0.0	60	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity Participation ir classes includ plan		Indidactic Participation in consultation hours		Self-study SUM				
	Number of study hours	60		8.0		57.0		125	
Subject objectives	Understanding the basic concepts and issues concerning the operation of microcontrollers and microprocessor systems. Getting to know the methods and tools for programming microprocessors and their peripherals.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_K02] can work in a group taking on different roles in it		Student can work in group and use specialized tools for family 8051 and ARM microprocesors for creation and staring programs.			[SK1] Assessment of group work skills			
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions		Student is able to applicate a proper literature and develope simpleprograms using C lenguage an Assembler for microcomupers 8051 family and ARM Cortex M3.			[SU1] Assessment of task fulfilment			
	[K6_W05] has basic knowledge of the principles of operation of basic electronic, energy and power electronic components and systems		Student explain the rules of microprocesor system work, distinguish base types of microprocesor systems architectures, describes base glases of memories and I/O uP system devices, knows base intefeaces.			[SW3] Assessment of knowledge contained in written work and projects			

Subject contents	LECTURE Microprocessor - the idea and history. Methods of data representation in microprocessor systems. Data encoding standards. Basic arithmetic and logical operations on binary data. Microprocessor system, the basic components and architecture. Internal structure and operating principle of a typical microprocessor. Programming in assembler and C language. Tools to build and run the software. Implementation of embedded software in the system. Microcontrollers from 8051 family: internal structure, modes of operation, the list of instructions. Characteristics of integrated peripheral components: ports, time-counters, interrupt controller, serial transmission system. Memory of microprocessor systems - types, characteristics, structure. Principles of cooperation between central processing unit, memory and I/O devices. Coupling of typical peripheral devices to the microprocessor. Methods of parallel and serial data transmission. Methods of measuring time and frequency. A/C and C/A converters. Microcontrollers of other families: AVR, PIC, ARM. Examples of the use of microcontrollers in automation systems.						
Prerequisites and co-requisites	Basic knowledge of digital technology. Ability to program in C language.						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Practical exercise	60.0%	50.0%				
	Written exam	60.0%	50.0%				
Recommended reading	Basic literature	 Varszawa 2002 Bogusz J.:, Programowanie mikrokontrolerów 8051 w języku C w praktyce, BTC, Warszawa 2005 Gałka P., Gałka P.: Podstawy programowania mikrokontrolera 8051, MIKOM, Warszawa 2002 Rydzewski A.: Mikrokomputery jednoukładowe rodziny MCS-51. WNT, Warszawa 1992 Paprocki P.:, Mikrokontrolery STM32 w praktyce, BTC, Warszawa 2009 Galewski M.: STM32. Aplikacje i ćwiczenia w języku C, BTC, Warszawa 2011 					
	Supplementary literature	 Bogusz J.: Lokalne interfejsy szeregowe, BTC, Warszawa 2004 Daca W.: Mikrokontrolery - od układów 8-bitowych do 32-bitowych. Wydawnictwo MIKOM, Warszawa 1992 Hadam P.: Projektowanie systemów mikroprocesorowych, Wydawnictwo BTC, Warszawa 2004 					
	exesources addresses	Adresy na platformie eNauczanie:					
Example issues/ example questions/ tasks being completed	Sample topics of laboratory exercises: 1. The use of the microcontroller input/output ports 2. Logic controller function implementation 3. 7-segment LED display driver implementation 4. The use of LCD alphanumeric display 5. The use of the microcontroller timers 6. Interrupts handling 7. Communication via UART interface						
Work placement	Not applicable						