GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microcontroller programming, PG_00059839					
Field of study	Automation, Robotics and Control Systems					
Date of commencement of studies	February 2023	Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies	Subject group				
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 Controlled Electric Drives -> Faculty of Electrical and Control Engineering					
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Filip Wilczyński				
	Teachers	dr inż. Filip Wilczyński				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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	15.0	5.0	50

Subject objectives	The aim of the course is to discuss selected microcontrollers with ARM core. Discussion of the ARM architecture and the possibility of using it in automation systems. Deepening the skills of programming in the C language by developing control functions. The programming of peripheral devices of the interface with the STM32 processor by the student allows the student to develop programming skills of modern electronic devices.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U04	The student is able to use the acquired knowledge to develop programming skills	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	K7_W06	The student is able to design an electronic circuit	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

Subject contents	1.ARM architecture
	2. ARM architecture.
	3.I/O Ports
	4. Programming in C and operations on bits
	5. Microcontroller interfaces (serial, parallel)
	6. A/C and D/A converter
	7. A/C and C/A converter continued.
	8. Interrupts, Timers, Clocks, etc.
	9. Overview of sample programs
	10. Discussion of sample programs cont.

Prerequisites and co-requisites	Basic programming skill in C/C++

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	50.0%	25.0%
	Laboratory	60.0%	75.0%

Recommended reading	Basic literature	1.Pełka R.: "Mikrokontrolery - architektura, programowanie, zastosowania". Wydawnictwa Komunikacji i Łączności, Warszawa 2003.
		2.Baranowski R.: "Mikrokontrolery AVR ATmega w praktyce", BTC, Warszawa 2006.
		3. Doliński J.: "Mikrokontrolery AVR w praktyce". BTC, Warszawa, 2004.
		4. Paprocki K. "Mikrokontrolery STM32 w praktyce", Wydawnictwo BTC 2009.
		5. www.arm.com
		6. www.st.com
		7. Yiu J.:The Definitive Guide to ARM® Cortex®-M3 and Cortex®-M4 Processors, Third Edition 2013.

	Supplementary literature	1. www.st.com 2. www.arm.com 3. http://stm32f4-discovery.com 4. https://my.st.com
	eResources addresses	Adresy na platformie eNauczanie: PROGRAMOWANIE MIKROKONTROLERÓW [2022/23] - Moodle ID: 28469 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28469
Example issues/ example questions/ tasks being completed	1. Software I/O ports 2. Timers, clocks, PWM software 3. A/C converter 4. USART serial communication 5. Interrupt controller	
Work placement	Not applicable	