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	