GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Embedded systems, PG_00057121		
Field of study	Mechatronics		
Date of commencement of studies	February 2023	**Academic year of realisation of subject**	2022/2023
Education level	second-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	1	**Language of instruction**	Polish
Semester of study	1	**ECTS credits**	2.0
Learning profile	general academic profile	**Assessment form**	assessment
Conducting unit	Department of Mechanics and Mechatronics -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Marek Galewski	
	Teachers	dr hab. inż. Marek Galewski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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	4.0	16.0	50

Subject objectives	Teaching students basic concepts of embedded systems and microcontrollers programming i C language

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W04] has detailed, supported by the theory knowledge in terms of electronic circuits, microelectronics and optoelectronics	Student describes principles of operation of MCU and it's peripherals	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K7_U06] is able to evaluate feasibility and possibility of application of new achievements (technical and technological) in terms of mechatronics	Student chooses parameters of the embedded system elemnts and develops programs in C language for ARM MCUs	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K7_W10] knows development trends and most important new achievements in technical sciences and science disciplines: Mechanical Engineering, Automation, Electronics and Electrical Engineering and related: Informatics and Materials Engineering	Student describes the process of embedded system design and manufacture	[SW1] Assessment of factual knowledge

Subject contents	Definitions of embeded systems, ways of implementation Microcontrollers - types, structure, ARM family Peripherals of micronotroller and it's main features - GPIO, IRQ, timers, DMA, ADC, data transmission Designs and manufacturing of mebeded systems

Prerequisites and co-requisites	Basic C programming

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam	51.0%	65.0%
	Laboratory execrcises	51.0%	35.0%

Recommended reading	Basic literature	Galewski M.STM32 Aplikacje i ćwiczenia w języku C z biblioteką HAL Marek Galewski, BTC, Legionowo, 2019 Huss E., The C Library Reference Guide http://www.acm.uiuc.edu/webmonkeys/book/c_guide/ Kernigham B. W., Ritchie D. M., Język ANSI C, WNT Warszawa, 2000 www.arm.com www.st.com/stonline/
	Supplementary literature	Ali Mazidi M. Stm32 Arm Programming for Embedded Systems, 2018
	eResources addresses	Adresy na platformie eNauczanie: Systemy Wbudowane, WL, MTR, II st., sem. 01, letni 2022/23 (PG_00057121) - Moodle ID: 26517 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26517
Example issues/ example questions/ tasks being completed	What is an Embedded System? What is a microcontroller? Present it's most characteristic features and elements What are the most important features or ARM Cortex architecture? What elements are neede to build an embedded system based on microcontroller What are GPIO used for? Full list of example questions are presented to students before the end of semester	
Work placement	Not applicable	