



Subject card

Subject name and code	Microprocessor Technology in Medicine, PG_00072206						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		Subject group				
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	Institute of Mechanics and Machine Design -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marek Galewski				
	Teachers		dr inż. Wiktor Sieklicki				
			dr hab. inż. Marek Galewski				
Lesson types	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						
	eNauczanie source addresses: Moodle ID: 4886 Technika Mikroprocesorowa w Medycynie, W/L, IMM, I st., sem. 05, zima 2026/27 (PG_00072206) https://enauczanie.pg.edu.pl/2025/course/view.php?id=4886						
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		1.0		19.0	50
Subject objectives	Presenting students essential information about applications of microprocessors in medical apparatus including architecture of microprocessor systems, data transmission and analog signals acquisition						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] is able to use information and communication skills or research techniques to solve typical engineering tasks related to design, production and manufacturing of materials or machine components		Performs simple design tasks in the field of measurements and microprocessor systems		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W05] has knowledge in the areas of design, manufacturing, and operation of materials, machine parts, or technical devices, with a solid understanding of design principles and technical documentation preparation		Identifies elements of the system and describes the architecture of the system built into the medical apparatus		[SW1] Assessment of factual knowledge		
	[K6_U04] is able to utilize empirical, analytical, simulation, and computer-based methods to formulate and solve engineering tasks in the field of medical and mechanical engineering		Understands the principles of implementation of analog and digital signal measurement tasks using microprocessor systems		[SU1] Assessment of task fulfilment		
	[K6_U06] can identify and formulate specifications for simple practical engineering tasks, and critically analyze existing technical solutions, evaluating their functionality, particularly in the context of designing mechanical and medical-mechanical devices		Understands the importance of the key parameters of microprocessors and their subsystems used in medical devices and the characteristics of their manufacturing technologies		[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	Course content – lecture		
	Introduction Applications and characteristics of microprocessor systems Processor construction and operation - Binary data recording - Processor construction and operating principles - Operating memory System elements and communication with the user - Introduction - GPIO ports - Meter systems - Hardware elements of communication with the user Data transmission - Introduction - Cooperation components - SPI interface - I2C interface - USART interface (RS232) - USB interface - Bluetooth interface Analog signal processing basics- A/C measurement path - Signal spectrum - Signal sampling - PWM signals Medical application examples Digital systems manufacturing		
	Course content – laboratory		
	performance of simple, practical measuement tasks using microcontroller system		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test	55.0%	60.0%
	Performing exercises during laboratoty classes	55.0%	40.0%
Recommended reading	Basic literature	Galewski M. STM32. Aplikacje i ćwiczenia w języku C z biblioteką HAL, BTC, Legionowo, 2019	
	Supplementary literature	Kurczyk A. Mikrokontrolery STM32 dla początkujących. BTC, Legionowo 2019	
	eResources addresses		
Example issues/ example questions/ tasks being completed	List of exemplary questions will be presente before the end of the semester - at least 4 weeks ahead of the final test e.g.: - What is the “Built-in System”? What are its characteristics, what does it consist of, how can it be realized? - How is parallel transmission different from serial transmission? How is synchronous and asynchronous transmission different? - Compare THT and SMT technologies. Give their advantages and disadvantages		
Practical activites within the subject	Not applicable		

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