



## Subject card

Subject name and code	Introduction to low level programming, PG_00037349						
Field of study	Technical Physics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group			Optional subject group 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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			7.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ryszard Barczyński					
	Teachers	dr inż. Marek Chmielewski dr hab. inż. Ryszard Barczyński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	45.0	0.0	0.0	75
	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	75	15.0		85.0		175
Subject objectives	The aim is to learn architecture and applications of microcontrollers.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U03	The student learns the basics of assembler language and learns to use the microcontroller structure. He can use cross-programming on personal computers.			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject		
	K6_K01	The student learns the peculiarities of microcontroller architecture and their evolution.			[SK5] Assessment of ability to solve problems that arise in practice		
	K6_W05	The student is able to design and program a simple measurement and control system.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
Subject contents	* Architecture and applications of microcontrollers. * Hardware of 8051 series microcontrollers. * Structure of assembly languages. Macrodefinitions. * 8051 assembly language. * Architecture and programming of Cypress PSoC I microcontrollers. * Local microcontroller interfaces: SPI, I2C, 1-wire. * Standard I/O expansion circuits. A/D and D/A conversions.						
Prerequisites and co-requisites	No requirements						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Practical exercise	51.0%			50.0%		
	Midterm colloquium	51.0%			50.0%		
Recommended reading	Basic literature	* Piotr Gałka, Paweł Gałka, Podstawy programowania mikrokontrolera 8051. * Jacek Bogusz, Lokalne interfejsy szeregowo w systemach cyfrowych, btc, Warszawa 2004. * Jacek Bogusz, Programowanie mikrokontrolerów 8051 w języku C w praktyce, btc, Warszawa, 2005. * Materiały do wykładów na stronie WWW * Materiały dotyczące mikrokontrolera PSoC na stronie WWW firmy Cypress <a href="http://www.cypress.com">www.cypress.com</a> .					

	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie: Wstęp do programowania niskiego poziomu 2025 - Moodle ID: 44197 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=44197">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=44197</a>
Example issues/ example questions/ tasks being completed	Desing circuit of a matrix keyboard.	
Work placement	Not applicable	

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