



Subject card

Subject name and code	Microprocessor techniques, PG_00058353						
Field of study	Hydrogen Technologies and Electromobility						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2027/2028		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Power Converters and Energy Storage Group -> Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Artur Cichowski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45	6.0	49.0	100		
Subject objectives	The objective of the course is for students to acquire knowledge and competencies in microprocessor techniques.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W14] knows and understands at an advanced level the principles, methods and techniques of programming and the principles of creating computer software or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, as well as the organization of the work of systems using computers or these devices						
	[K6_K01] is aware of the need for continuous education and self-improvement and knows the possibilities of further education	is aware of the necessity to extend their knowledge in digital techniques and microprocessors			[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	<p>Course content – lecture</p> <p>LECTURE Architectures of microprocessors and microcontrollers. Central processing unit, bus, memory, input/output systems, registers, program counter, stack / stack pointer, interrupts. C language programming of microprocessors (based on the STM32L496ZGT6 microcontroller in the STM32CubeIDE environment). Subroutines. Interrupt service routines. Fundamentals of digital electronics: combinational logic design, sequential logic design, basic medium-scale integration logic circuits (multiplexers/demultiplexers, decoders, adders, memories, registers, counters). LABORATORY Use of the Quartus II design environment for the design, FPGA implementation and testing of basic logic circuits (gates, flip-flops, registers, counters, memories, and other combinational and sequential circuits). C-language programming of the STM32L496ZGT6 microcontroller. Use of I/O ports, interrupt service routines, buttons and switches handling, Software implementation of a daily clock with seven-segment displays, alphanumeric display routines, configuring and use of the embedded A/D converters and PWM channels.</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 647 794 678">Subject passing criteria</th> <th data-bbox="799 647 1137 678">Passing threshold</th> <th data-bbox="1142 647 1481 678">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 685 794 712">Laboratory practical exercises</td> <td data-bbox="799 685 1137 712">60.0%</td> <td data-bbox="1142 685 1481 712">80.0%</td> </tr> <tr> <td data-bbox="456 719 794 745">Colloquium during semester</td> <td data-bbox="799 719 1137 745">60.0%</td> <td data-bbox="1142 719 1481 745">20.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory practical exercises	60.0%	80.0%	Colloquium during semester	60.0%	20.0%
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Recommended reading	<p>Basic literature</p>	<p>1. Cichowski A., Śleszyński W., Szczepankowski P.: Technika cyfrowa i mikroprocesorowa, Politechnika Gdańska, Wydział Elektrotechniki i Automatyki, Gdańsk 2010.2. Galewski. M.: STM32. Aplikacje i ćwiczenia w języku C z biblioteką HAL. BTC; Legionowo 2019.3. Kurczyk A.: Mikrokontrolery STM32 dla początkujących. BTC; Legionowo 2019</p>										
	<p>Supplementary literature</p>	<p>1. Skorupski A.: Podstawy techniki cyfrowej. Warszawa: WKŁ 2001.2. Paprocki. K.: Mikrokontrolery STM32 w praktyce. BTC; Legionowo 2009.3. Documentation of electronic modules4. STMicroelectronics documentations (product specifications, reference manuals for STM32L496ZGT6)5. Kernighan B. W., Ritchie D. M.: Język ANSI C. WNT, Warszawa 1998.</p>										
	<p>eResources addresses</p>											
Example issues/ example questions/ tasks being completed	<p>1) Write a program to control the LEDs as a function of logical operations of the microcontroller inputs.2) Write a LED control program with variants of preset sequences changed in case of pressing monostable switches.</p>											
Practical activities within the subject	<p>Not applicable</p>											

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