GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microprocessor techniques, PG_00058353		
Field of study	Hydrogen Technologies and Electromobility		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Artur Cichowski	
	Teachers		

Lesson types and methods of instruction

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_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

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 displayroutines, configuring and use of the embedded A/D converters and PWM channels.

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Colloquium during semester</td><td>60.0%</td><td>20.0%</td></tr>
<tr><td>Laboratory practical exercises</td><td>60.0%</td><td>80.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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 20193. Kurczyk A.: Mikrokontrolery STM32 dla początkujących. BTC; Legionowo 2019</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Skorupski A.: Podstawy techniki cyfrowej. Warszawa: WKŁ 2001.2. Paprocki. K.: Mikrokontrolery STM32 w praktyce. BTC; Legionowo 20093. 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.</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">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 monostableswitches.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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