GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Built-in systems, PG_00060476		
Field of study	Mechatronics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Mechatronics -> 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		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	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	2.0	18.0	50

Subject objectives

Teaching students basic concepts of embedded systems and microcontrollers programming (in C language)

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U09] is able to formulate an algorithm, knows low and high level programming languages and appropriate IT tools for developing computer programmes to control mechatronic system	Student develops simple programs that utilise essential elements of MCU system	[SU1] Assessment of task fulfilment
[K6_W06] has organised knowledge in the field of informatic that includes architecture of computer systems, programming of computers and embedded systems and elements of software engineering	Student presents principles of operation of essential elements of embedded systems	[SW1] Assessment of factual knowledge
[K6_W07] has organised knowledge in the field of metrology; knows and understands methods for measurement and processing of basic quantities that characterize mechatronic systems; knows basic methods of analogue and digital signals processing and computational methods and IT tools essential for analyses of experimental results	Student understands rules of performing analog and digital signals measurement tasks, specific fo embedded systems	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
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

Konwledge of basics of computer systems archiotecture and basiec of programming C language

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Colloqium</td><td>52.0%</td><td>65.0%</td></tr>
<tr><td>Practical exercises</td><td>52.0%</td><td>35.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>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/
Kernighan B. W., Ritchie D. M., The ANSI C Language, Prentice Hall, 1988
www.arm.com
www.st.com/stonline/</td></tr>
<tr><td>Supplementary literature</td><td>Ali Mazidi M. Stm32 Arm Programming for Embedded Systems, 2018</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">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</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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