GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programming Communication Micromodules, PG_00048106		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2029/2030
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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Microwave and Antenna Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Łukasz Kulas	
	Teachers	dr hab. inż. Łukasz Kulas	

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

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

The aim of the subject is introduction to wireless embedded devices programming, getting familiar with the rules of embedded devices programming and basics of wireless embedded devices programming techniques.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Ability to develop programs for simple wireless embedded system. Ability to present realized programming tasks with respect to IC programming for wireless communication.	[SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Lecture

• Introduction to wireless embedded devices programming
• Rules of embedded devices programming
• Basics of wireless embedded devices programming
• Exceptions and memory management in wireless embedded devices context
• Coding standards for the development of embedded devices
• Introduction to embedded devices programming using API
• Embedded devices programming using API - basic operations
• Embedded devices programming using API - operations on peripherals
• Memory operations during the process of code development for embeded devices
• Advanced bit operations
• Introduction to embedded devices programming without API
• Embedded devices programming without API

Laboratory

• Introduction to embedded devices programming using API
• Embedded devices communication
• Development of wireless mesh network for embedded devices
• Embedded devices programming using API - operations on peripherals
• Development of embedded systems</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of C/C++ programming. Student schould have knowledge of the course Wireless Devices Design, particulary in the field of ZigBee technology.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Final test</td><td>50.0%</td><td>50.0%</td></tr><tr><td>Laboratory score</td><td>50.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>1. Herb Sutter, Andrei Alexandrescu, „C++ Coding Standards: 101 Rules, Guidelines, and Best Practices”
2. Http://microcontroller.com/
3. Joe Pardue, „C Programming for Microcontrollers”</td></tr><tr><td>Supplementary literature</td><td>1. Joseph Yiu, „The Definitive guide to the ARM CORTEX-M
2. Krzysztof Paprocki, „Mikrokontrolery STM32 w praktyce”
3. Mats Henricson, Erik Nyquist, „Industrial Strength C++: Rules and Recommendations”</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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