GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Basics of control , PG_00061902		
Field of study	Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Corrosion and Electrochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Łukasz Gaweł	
	Teachers	dr inż. Łukasz Gaweł	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	30.0	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	5.0	15.0	50

Subject objectives

Mastery of basic programming in the derivative of the C language using the TinkerCad tool for learning control of virtual tools, such as temperature sensors, humidity sensors, and servomechanisms. The student will become familiar with basic commands and the structure of a program for handling and reading data from peripheral devices.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] Can critically analyze and evaluate the functioning – particularly in the context of materials engineering –existing technical solutions, particularly equipment, objects, systems, processes.	Student can assess the type of device and its communication method with the microcontroller.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W05] Has the knowledge of mechanics, technology and electrical engineering, including engineering graphics and using computer aid, the use of databases in the design of technological processes.	The student is familiar with basic concepts related to the functioning of source code and methods of uploading it.	[SW1] Assessment of factual knowledge
[K6_W04] Knows selected aspects of construction and operation of scientific equipment in materials engineering.	The student is familiar with basic concepts related to the operation of peripheral systems available for microcontrollers	[SW1] Assessment of factual knowledge
[K6_K01] Understands the need to improve professional and personal competencies; is conscious of own limitations and knows when to turn to experts, properly establishes priorities helping to accomplish tasks defined by oneself or others.	The student is able to use libraries and teaching aids to improve his/her competences in programming control systems	[SK5] Assessment of ability to solve problems that arise in practice

<table>
<tr><td>Subject contents</td><td>Course content – laboratory

Introduction to Arduino: hardware, programming environment, code structure, virtual tools.Digital and analog I/O channels. Simple I/O operations.Communication and control of peripheral systems. Discussion of selected peripheral systems. Construction of systems based on peripheral devices.Use of available libraries.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge in the operation of computers and peripheral devices. Basic electrical knowledge.</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>Laboratory</td><td>60.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Getting Started with Arduino 4e Michael Shiloh</td></tr>
<tr><td>Supplementary literature</td><td>Online documentation, step-by-step courses, and videos available on popular internet platforms.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Construction of a temperature measurement system based on Arduino.

Creation of a system of IO-controlled devices along with software for recording and processing experimental data, signal analysis.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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