GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Automation of the measurement process, PG_00051074		
Field of study	Technical Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Ryszard Barczyński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	15.0	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	2.0	28.0	75

Subject objectives

The aim of the course is to acquire basic knowledge in the field of measurement and control using IT

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] has knowledge of technical sciences related to physics, including electronics or energy engineering, and understands their application in the design and implementation of technological processes.	The student is able to analyze the needs of physical measurements required by technical processes and determine their methodology.	[SW3] Assessment of knowledge contained in written work and projects
[K6_W05] has knowledge of programming methodologies and techniques, as well as the use of selected IT tools in physics and engineering.	The student creates software for a self-built measurement system in LabView.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
[K6_U05] is able, individually or in a team, to design and construct simple devices, measuring instruments or technical systems using appropriately selected methods, techniques, tools and materials.	The student builds a measurement system using USB sensors and measurement modules.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K6_U06] is able to identify and assess risks, economic efficiency and the applicability of proposed engineering solutions, including critical evaluation taking into account non-technical factors such as ethical aspects.	The student analyzes the cost of the completed project.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task

<table>
<tr><td>Subject contents</td><td>Course content – lecture
Elements and architecture of the measurement system

Analog-to-digital conversion

Digital to analog conversion

Basics of automatic control processes

Links for digital data transmission in measurement systems

Basic types of interfaces used in digital measurement systems
Course content – laboratory
Sensor use and operation

Measurement devices operating via USB interface.

LabView software.
Course content – project
Solution to the given task based on a self-built measurement system and software created using LabView.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></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 exam</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>Ocena sprawozdań</td><td>51.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>1. Tadeusz Stacewicz, Andrzej Kotlicki Elektronika a laboratorium naukowym
2. Waldemar Nawrocki Komputerowe systemy pomiarowe.
3. National Instruments LabView User Manual</td></tr>
<tr><td>Supplementary literature</td><td>National Instruments web page</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>• A/D conversion methods
• The structure of the measurement system</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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