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 2023	Academic year of realisation of subject	2025/2026
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	dr inż. Marek Chmielewski dr hab. inż. Ryszard Barczyński	

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_W07] Has knowledge of the construction and operation of physical instruments, measurement and research equipment.	The student analyzes the principles of operation and the properties of the individual components of the measurement system.	[SW1] Assessment of factual knowledge
[K6_U02] Can analyze and solve simple scientific and technical problems, based on possessed knowledge, using analytical, numerical, simulation and experimental methods.	Based on the given task, the student determines the method of solving the task based on his/her knowledge,	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
[K6_U05] Can design and build a simple measuring device	The student builds a measurement system, tests it, and presents a report on the activities.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
[K6_U06] Can make an initial economic analysis of undertaken engineering activities.	The student analyzes the cost of building a measurement system.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject
[K6_W05] Has knowledge of programming methodology and techniques, and the use of selected IT tools in physics and technology.	The student creates research station software and analyzes the collected data.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation

<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>
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</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>
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<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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