GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00065837		
Field of study	Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	
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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Solid State Physics -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Chmielewski	
	Teachers	dr inż. Marek Chmielewski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	30.0	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	5.0	50.0	100

Subject objectives

The purpose of the course is to familiarize the student with the capabilities of National Instruments' LabVIEW engineering software at a level that allows individual development of simple, functional applications. As part of the course, the student will learn the capabilities of the environment and the basics of using the graphical programming system used in the LabVIEW language. The lecture will present, based on examples, the range of possible applications of the environment in the support and operation of research measurement systems from the level of operation control to advanced post processing operations or report preparation. The scope of possible applications of the environment will also be presented, from simple IT systems to advanced solutions cooperating with industrial controllers. The course makes it possible to approach the CLAD certification exam.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U06] Can evaluate usefulness and feasibility of using new achievements (techniques and technologies) within the scope of materials science.	Students will analyze the impact of the development of technology and new scientific content on the environment, they will be able to determine the scope of safe use of advanced technical solutions. He or she can assess the importance of maintaining balance in the field of technological progress.	[SU2] Assessment of ability to analyse information
[K7_U01] Can obtain information from literature, databases and other properly selected sources, also in English; can integrate the obtained information, interpret and draw conclusions, formulate and justify opinions	The student is able to independently, on the basis of his knowledge, construct an algorithm and apply the knowledge of technical sciences to solve any scientific problem. Applies in an optimized way the rules of physics mathematics chemistry to improve existing industrial and research control systems.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W02] Knows experimental, observatory and numerical techniques, as well as methods of building mathematical models relevant to materials engineering; can independently recreate basic theorems and laws, and their proofs.	The student is able to independently, on the basis of his knowledge, create software to solve a problem related to the automation of the measurement process, the analysis of measurement data, a problem in any technical tasks including for materials engineering.	[SW1] Assessment of factual knowledge

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

Lab: The lab with elements of lecture will be devoted to getting acquainted with the idea of the labVIEW programming environment. During the course of the lab, in the initial part of the class, students will do work reproducing the activities of the instructor in order to build the first functional programs. In the course of the following classes, students will begin to independently construct simple programs supporting the graphical user interface of the LabVIEW environment to then, among other things, move on to the use of LabVIEW for communication with internal (computer sound card) and external measuring devices. The topic of analog-to-digital processing in measuring devices will be introduced in a practical manner, as well as ways to parameterize and quantify digital measurement signals. The issue of using the environment to control classical measuring devices (digital oscilloscopes, arbitrary generators, multimeters ltd.) will also be presented.

Project: as part of the project, students in the second part of the course, will start working on solving with the LabVIEW environment, simple problems that can be implemented with the LabVIEW environment. Topics of the projects carried out by the students may include:

1. Virtual dice.
2. A real-time physical pendulum simulator.
3. A computer interface for, reasonably complete, operation of a multi-channel digital oscilloscope.
4. Functional design of a calculator performing four basic mathematical operations, the functionality of which exactly corresponds to its real counterpart.
5. Control and full control of uni and bipolar stepper motor operation.

A smart compass using a linear magnetic field sensor cooperating with the stepper motor.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Not required</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>Test funkcjonalności i estetyka</td><td>75.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>Internet resources

www.ni.com/en.html

www.udemy.com/topic/labview/

https://download.ni.com/support/manuals/321527e.pdf

https://home.agh.edu.pl/~koniejar/LVlinki/1.%20Get%20Started%20with%20LabVIEW_pl.pdf</td></tr><tr><td>Supplementary literature</td><td>not required</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Classic elements of programming languages used in the LabVIEW environment.

Controls, pointers, local variables. Front panel vs. block diagram</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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