



Subject card

Subject name and code	Advanced programming in LabView, PG_00062748						
Field of study	Technologies for Industry 5.0						
Date of commencement of studies	October 2024	Academic year of realisation of subject				2027/2028	
Education level	first-cycle studies	Subject group				Obligatory subject group in the field of study 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 Polish	
Semester of study	7	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Chmielewski					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	30.0	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 purpose of the course is to prepare students for the effective use of the LabVIEW environment used as a tool for advanced digital signal processing. The subject is intended to encourage extensive use of the environment, especially in the preparation of engineering and master's theses in the field of advanced numerical processing of measurement signals.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_K03] effectively, clearly and unambiguously conveys information, describes activities and communicates their results and opinions of a specialist engineer using appropriate communication methods and tools	The student is skilled in designing computational algorithms as well as their direct implementation in a programming environment. Can use tools from the Advanced Signal Analyzer package from the LabVIEW package. Can effectively scale models of digital computational algorithms.			[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice		
	[K6_U01] applies knowledge of mathematics, physics, chemistry, IT tools and other engineering disciplines to solve theoretical, engineering and technological problems	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			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[K6_W01] demonstrates knowledge and understanding of mathematics, physics, chemistry and IT tools at the level necessary to formulate and solve typical engineering and technological problems	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.			[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	The content of the course is the comprehensive use of the LabVIEW package in the field of wide-area digital signal analysis. Digital signal filtering methods, effective interpolation and extrapolation techniques will be presented and tested. Activities in mathematical processing of digital signals including integration and differentiation procedures, filtering using Fourier transform and Wavelet analysis, including in the time domain. Techniques for parameterizing noise signals will be presented. Techniques for reporting computational results in LabVIEW will be presented.						

Prerequisites and co-requisites	Completed course: Programowanie w języku LabView		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final project	100.0%	100.0%
Recommended reading	Basic literature	Online resources provided by Natinal Instruments among others: https://learn.ni.com/learn/article/getting-started-with-fpga https://www.ni.com/docs/en-US/bundle/labview-advanced-signal-processing-toolkit-api-ref/page/lvasptconcepts/aspt_default_page.html Digital Signal Processing and Spectral Analysis for Scientists Springer International Publishing AG , marzec 2019	
	Supplementary literature	Not Required	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Discrete digital signal analysis Fast Fourier Transform Time domain Fourier transform Wavelet analysis Digital interpolation and extrapolation		
Work placement	Not applicable		

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