



Subject card

Subject name and code	The virtual measurement instruments, PG_00044110						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		English		
Semester of study	5		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Partment of Metrology and Information Systems -> Faculty of Electrical and Control Engineering -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Beata Pałczyńska				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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	To familiarize the student with methods and tools for programming virtual measurement systems. The student will master the ability to design and test a virtual measuring instrument.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W10		determines the power supply conditions for the hardware part of the virtual measurement instrument.		[SW3] Assessment of knowledge contained in written work and projects		
	K6_K01		designs applications supporting the programming of measurement systems.		[SK3] Assessment of ability to organize work		
	K6_K05		follows safety rules in the event of a failure of the measuring stand-up.		[SK5] Assessment of ability to solve problems that arise in practice		
	K6_U10		designs a power supply system for various interfaces in the measurement system		[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	K6_U09		selects power equipment in the measurement system.		[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	<p>LECTURE The virtual instrument (VI) as a generous trend in measurement instrumentation. The conception of the virtual measuring instruments. The structure and the organization of computer-based measuring systems. The basis functional blocks. The measurement system configuration. The programming panels. The graphical user interface. The hardware of VIs. The multi-function data acquisition board DAQ - construction and applications. DAQ signals, The signal conditioning. The interface standards in measuring system. The system interface bus. The serial interface. Measuring systems based on IEC-625 interface. The software environment for development of measurement systems. Introduction to LabVIEW development environment, graphical programming language G, Virtual Instrument as basic module of creating application in G language. Integration of VIs to computer network. VIs working under RTOS.</p> <p>LABORATORY Design and implementation of VIs, practical aspects.</p> <p>Advantages and disadvantages of VIs - analysis of development.</p>		
Prerequisites and co-requisites	Basic knowledge of electrical metrology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture - final test	60.0%	20.0%
	Laboratory - completed exercises	100.0%	80.0%
Recommended reading	Basic literature		<ol style="list-style-type: none"> 1. Winiecki W.: Organizacja komputerowych systemów pomiarowych, Oficyna Wydawnicza PW, Wyd. 1, Warszawa 1997. 2. Świsulski D.: Komputerowa technika pomiarowa, Agenda Wydawnicza PAK, Warszawa 2005. 3. Świsulski D.: Przykłady cyfrowego przetwarzania sygnałów w LabVIEW, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2014. 4. Lesiak P., Świsulski D.: Komputerowa technika pomiarowa w przykładach, Agenda Wydawnicza PAK, Warszawa, 2002. 5. Jerome, Jovitha. Virtual instrumentation using LabVIEW. PHI Learning Pvt. Ltd., 2010.
	Supplementary literature		Wells L.: LabVIEW Student Edition User's Guide, Prentice Hall. 2010
	eResources addresses		Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Characterize a virtual instrument concept. 2. Describe a data acquisition path in a typical computer-based measurement system 3. The serial interface basic characteristics. 4. The parallel interface basic characteristics. 5. The principles of using standard interfaces like RS-232, USB, GPIB to configure a virtual measurement system controlled by a PC. 6. The principles of designing DAQ measurement system. 		
Work placement	Not applicable		

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