



Subject card

Subject name and code	, PG_00053427						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	4		Language of instruction		Polish		
Semester of study	7		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Metrology and Information Systems -> Faculty of Electrical and Control Engineering						
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		40.0	75
Subject objectives	Introduce students with the methods and tools for programming of virtual measurement systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks		The student is able to design a virtual instrument in a graphical environment supporting measurement system software.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W10] has basic knowledge related to mechatronics and robotics systems		The student knows measurement tools and programs cooperating with these tools in measurement systems.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_U03] can prepare and present a presentation on the problems and results of an engineering task		The student is able to interpret measurement results obtained in a measurement system based on virtual instruments.		[SU5] Assessment of ability to present the results of task		
	[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions		The student knows the block structure of a measurement system based on virtual instruments.		[SU2] Assessment of ability to analyse information		

Subject contents	<p>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.</p> <p>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.</p> <p>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.</p> <p>Integration of VIs to computer network. VIs working under RTOS.</p> <p>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
	Laboratory - completed exercises	100.0%	80.0%
	Lecture - final test	60.0%	20.0%
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. Lesiak P., Świsulski D.: Komputerowa technika pomiarowa w przykładach, Agenda Wydawnicza PAK, Warszawa, 2002.4. 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 system3. 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		