

## 表 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Data acquisition, processing and transmission systems, PG_00051705								
Field of study	Transport								
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024				
Education level	second-cycle studies		Subject group						
Mode of study	Full-time studies		Mode of delivery		at the university				
Year of study	2		Language of instruction		Polish				
Semester of study	3		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Power	Electronics an	d Electrical Machines -> Faculty of Electrical and Control Engineering						
Name and surname	Subject supervisor		dr hab. inż. Andrzej Wilk						
of lecturer (lecturers)	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial Laboratory		Project	roject Seminar		SUM	
	Number of study hours	30.0	0.0	0.0	15.0		0.0	45	
	E-learning hours inclu	uded: 0.0						0.00	
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	45		0.0	1			45	
	<ul> <li>to give student the knowledge of data acquisition in modern transport.</li> <li>learning of student data processing methods and data collection in database for transport purposes,</li> <li>learning of student data transmission methods using interfaces applied in modern transport.</li> </ul>								
Learning outcomes	Course out	come	Subject outcome			Method of verification			
	[K7_W13] has advanced knowledge of the design and management of transport systems to an extent required of the specialty		Student is able to design a general system for acquisition, archiving and processing data from a transportation system			[SW3] Assessment of knowledge contained in written work and projects			
	[K7_W04] has basic knowledge of teleinformatic systems used in transport		Student has basic knowledge in the field of teleinformatics systems			[SW3] Assessment of knowledge contained in written work and projects			
	[K7_W05] has basic knowledge of control in transport systems		Student knows the basics of control in transportation systems			[SW3] Assessment of knowledge contained in written work and projects			
	[K7_U13] able to solve detailed problems of transport systems to an extent required of the specialty		Student is able to solve selected issues regarding data acquisition in transportation systems			[SU1] Assessment of task fulfilment			
	[K7_W04] has basic knowledge of teleinformatic systems used in transport		The student knows the basic IT systems in transport			[SW3] Assessment of knowledge contained in written work and projects			
	[K7_W05] has basic knowledge of control in transport systems		Student knows the basics of control in transportation systems			[SW3] Assessment of knowledge contained in written work and projects			
	[K7_W13] has advanced knowledge of the design and management of transport systems to an extent required of the specialty		The student has knowledge of data acquisition, transmission and data storing systems in the field relevant to the Transport specialization			[SW2] Assessment of knowledge contained in presentation			
	[K7_U13] able to solve detailed problems of transport systems to an extent required of the specialty		The student is able to design a data acquisition, transmission and processing system for a transport case study.			[SU4] Assessment of ability to use methods and tools			

Subject contents	Lecture Selected aspects of signal processing. Electronic communication systems (Wide Area Network, Local Area Network, mobile communication systems, satellite based systems). Wired data transmission systems. Wireless data transmission systems. Data bus architecture in traction units and transmission protocols. Communication interfaces applied for transport purposes. Data Acquisition Systems DAQ. Virtual Machine Environment (VXI), PCI eXtensions for Instrumentation (PXI), Supervisory Control and Data Acquisition (SCADA) measurement systems. Databases for transport purposes. Creating and initializing of databases - an example of SQL server. Communication languages of databases - an example of Structural Query Language (SQL). Organization of information and data types in data bases. Methods od data edition and data processing in data bases.						
	Laboratory						
	Introduction to signals and their parameters. Mathematic principles of signal analysis. The Fourier series. Fourier Transform and Fourier integrals. Discretization of analog signals. Discrete Transform Fourier algorithms. Wave signal compression. Basics of analysis and data processing of 2D signals. Implementation of DSP algorythms for signal processors.						
	Project						
	Project on selected data acquisition, data processing and data transmission systems (team work)						
Prerequisites and co-requisites	<ul> <li>Basic knowledge about principles of:</li> <li>electric metrology,</li> <li>electrical and electronic engineering,</li> <li>telecommination</li> </ul>						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Project	60.0%	50.0%				
	Exam	60.0%	50.0%				
Recommended reading	Basic literature       Gajek A., Juda Z.: Czujniki, WKŁ, Warszawa 2008.         Simmonds A.: Wprowadzenie do transmisji danych, WKŁ, Warszawa, 1999						
		Fryskowiak B., Grzejszczyk E.: Systemy transmisji danych, WKŁ, Warszawa 2010.					
		Zimmerman W., Schmidgail R.: Magistrale danych w pojazdach, WKŁ, Warszawa 2008.					
	Supplementary literature	Kehtarnavaz N.: Digital Signal Processing System Design: LabVIEW- Based Hybrid Programming, Elsevier, 2008.					
		Kehtarnavaz N.: Digital Signal Proc Based Hybrid Programming, Elsevio	essing System Design: Labview- er, 2008.				
		Kehtarnavaz N.: Digital Signal Proc Based Hybrid Programming, Elsevid Zieliński T.: Cyfrowe przetwarzanie WKŁ, Warszawa 2005.	essing System Design: LabviEw- er, 2008. sygnałów. od teorii do zastosowań,				
	eResources addresses	Kehtarnavaz N.: Digital Signal Proc Based Hybrid Programming, Elsevia Zieliński T.: Cyfrowe przetwarzanie WKŁ, Warszawa 2005. Adresy na platformie eNauczanie: Systemy Zbierania, Przetwarzania 38735 https://enauczanie.pg.edu.pl/moodl	essing System Design: LabviEW- er, 2008. sygnałów. od teorii do zastosowań, i Transmisji Danych - Moodle ID: le/course/view.php?id=38735				
Example issues/ example questions/ tasks being completed	eResources addresses  1. What are the major functional	Kehtarnavaz N.: Digital Signal Proc Based Hybrid Programming, Elsevia Zieliński T.: Cyfrowe przetwarzanie WKŁ, Warszawa 2005. Adresy na platformie eNauczanie: Systemy Zbierania, Przetwarzania 38735 https://enauczanie.pg.edu.pl/moodl blocks of measurement system	essing System Design: LabviEW- er, 2008. sygnałów. od teorii do zastosowań, i Transmisji Danych - Moodle ID: le/course/view.php?id=38735 ?				
Example issues/ example questions/ tasks being completed	eResources addresses 1. What are the major functiona 2. What is the structure of meas	Kehtarnavaz N.: Digital Signal Proc Based Hybrid Programming, Elsevia Zieliński T.: Cyfrowe przetwarzanie WKŁ, Warszawa 2005. Adresy na platformie eNauczanie: Systemy Zbierania, Przetwarzania 38735 https://enauczanie.pg.edu.pl/moodl blocks of measurement system? urement system with Ethernet?	essing System Design: LabviEw- er, 2008. sygnałów. od teorii do zastosowań, i Transmisji Danych - Moodle ID: le/course/view.php?id=38735 ?				