



Subject card

Subject name and code	, PG_00069813						
Field of study	Transport						
Date of commencement of studies	February 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		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Andrzej Wilk				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		0.0		0.0	45
Subject objectives	The main goal of this course is: - to give student the knowledge of data acquisition in modern transport. - learning of student data processing methods and data collection in database for transport purposes, - learning of student data transmission methods using interfaces applied in modern transport.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_K01] recognizes the importance of knowledge related to the field of study in solving cognitive and practical problems		The student is able to list and describe the structural elements of the measurement system of a vehicle providing a public transport service.		[SK2] Assessment of progress of work		
	[K7_U05] cooperates with other people in the implementation of team work, both as a leader and a team member, effectively achieving set goals		The student implements the principles of group work		[SU1] Assessment of task fulfilment		
	[K7_W01] identifies in an in-depth way phenomena related to the field of study as well as theories describing them and possible methods of analyzing processes occurring in the life cycle of technical systems		The student is able to define the elements of the measurement system structure and determine their functionality: sensor, transducer, conditioner, A/D converter, buffer and data bus interface.		[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	Course content – 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 of data edition and data processing in data bases.		
	Course content – 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 algorithms for signal processors.		
Prerequisites and co-requisites	Course content – project		
	Project on selected data acquisition, data processing and data transmission systems (team work)		
Assessment methods and criteria	Basic knowledge about principles of:		
	• electric metrology, • electrical and electronic engineering, • telecommunication.		
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	50.0%
Recommended reading	Exam	60.0%	50.0%
	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.	
Supplementary literature	Zimmerman W., Schmidgail R.: Magistrale danych w pojazdach, WKŁ, Warszawa 2008.		
	Kehtarnavaz N.: Digital Signal Processing System Design: LabVIEW-Based Hybrid Programming, Elsevier, 2008.		
	Zieliński T.: Cyfrowe przetwarzanie sygnałów. od teorii do zastosowań, WKŁ, Warszawa 2005.		
Example issues/ example questions/ tasks being completed	eResources addresses		
	1. What are the major functional blocks of measurement system?		
Practical activities within the subject	2. What is the structure of measurement system with Ethernet?		
	Not applicable		

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