GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069813		
Field of study	Transport		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
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_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
[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

<table>
<tr><td>Subject contents</td><td>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 od 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 algorythms for signal processors.
Course content – project
Project on selected data acquisition, data processing and data transmission systems (team work)</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge about principles of:
• electric metrology,
• electrical and electronic engineering,
• telecomunication.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Exam</td><td>60.0%</td><td>50.0%</td></tr><tr><td>Project</td><td>60.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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.</td></tr><tr><td>Supplementary literature</td><td>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.</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>1. What are the major functional blocks of measurement system?

2. What is the structure of measurement system with Ethernet?</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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