GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Power Engineering and Telematics in Transportation, PG_00038379		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Electrical Engineering of Transport -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Mikołaj Bartłomiejczyk	
	Teachers	dr hab. inż. Mikołaj Bartłomiejczyk	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	20.0	0.0	10.0	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	65.0	100

Subject objectives

Student describes and develops traction power systems for for vehicles transportations and long-distance transport. Presents the process of modelling these systems. Explains the issue of cooperation with the current collector overhead contacline. Student has general basic knowledge of transport telematics systems and skillfully selected technologies used in transport telematics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W07	Can perform and interpret analysis results	[SW3] Assessment of knowledge contained in written work and projects
K7_K02	The student is able to define energy demand individual measures transport	[SK5] Assessment of ability to solve problems that arise in practice
K7_U11	Technical skill economic analysis of traction energy system	[SU1] Assessment of task fulfilment

Subject contents

LECTURE Tasks and specificity of energy of transport by land, air and sea. Power systems of electric traction in the world. Traction substations - remote control systems. Overhead catenary systems, especially on high speed. Power of the vehicle. Applications of power electronics converters in transport. Traction energy storage - batteries, supercapacitors, flywheels and hybrid. Methods and algorithms for the calculation of traction power supply systems. Modeling of electric traction power supply system. Mathematical models of a dynamic relationship with the current collector traction. Criteria for assessing the quality of cooperation current collector. Diagnostics of overhead catenary systems, contact line - pantograph interaction. The genesis of telematics transport. Standardization of telematics. The telematics systems for rail vehicles and road. Communication network architecture in vehicle. Interface man - machine, HMI. Integrated information systems. Telematics devices. Navigation and telecommunications. Systems: measuring the flow of travelers, travel information, warning and control systems in vehicles and on the road, against-accident, e-automation of highway, vehicles and cargo identification and others. Information about the traffic and its control. Intelligent transport systems. Development trends of transport. OPEN-AIR LABORATORY Construction of contact line system and track return system. Structure of traction substation. Remote control systems - construction and functioning. Traffic control systems.

Prerequisites and co-requisites

Basic understanding of electric traction, power electronics and informatics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Report from laboratory exercises	60.0%	25.0%
Midterm colloquium	60.0%	75.0%

Recommended reading	Basic literature	1. Głowacki K., Onderka E.: Sieci trakcyjne. Bibice: EMTRAK 2002. 2. Podoski J., Kacprzak J., Mysłek J.: Zasady trakcji elektrycznej. Warszawa: WKŁ 1980. 3. Praca zbiorowa, red. Strojny J.: Trakcja elektryczna prądu stałego. Układy zasilania. Podręcznik INPE dla elektryków. Zeszyt 27.SEP-COSiW, Warszawa, 2009. 4. Giętkowski Z., Karwowski K., Mizan M.: Diagnostyka sieci trakcyjnej. Gdańsk: Wyd. PG 2009/Biblioteka Cyfrowa Politechniki Gdańskiej. 5. Adamski A.: Inteligentne systemy transportowe. Uczelniane Wydawnictwa Naukowo Techniczne AGH, Kraków 2003. 6. Piecha J. (red.): Rejestracja i przetwarzanie danych w telematycznych systemach transportu. Monografia. Wyd. Politechniki Śląskiej, Gliwice 2003. 7. Steimel A.: Electric Traction - Motion Power and Energy Supply.Oldenbourg Industrieverla 2007.
	Supplementary literature	1. www.pkp.com.pl, www.transportszynowy.200.pl, www.kieppe-elektrik.com, www.pesa.pl, www.railway-technology.com, www.railroaddata.com, www.raileurope.com, www.trainweb.org. 2. Czasopisma: Technika Transportu Szynowego, Elektrische Bahnen, Revue Generale des Chemins de Fer. 3. Nowacki G. (red.): Telematyka transportu drogowego. Warszawa: ITS, 2008.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Power systems of electric traction in the world. 2. Methods for the calculation of traction power supply systems. 3. Tracton energy storage. 4. Telecommunication systems in transportation.	
Work placement	Not applicable	