



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 2023	Academic year of realisation of subject			2024/2025		
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. Dariusz Karkosiński					
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 contactline. 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_K02		It indicates the key elements of the transport system from the point of view of a sustainable economy.		[SK5] Assessment of ability to solve problems that arise in practice		
	K7_U11		Assesses the condition of the electric traction power system. Indicates necessary changes.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
	K7_W07		Calculates vehicle requirements based on utility and technical parameters. Power is disconnected from the recuperated power supply.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	<p>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. The genesis of telematics transport. Standardization of telematics. The telematics systems for rail vehicles and road. 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.</p> <p>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.</p>						

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	50.0%	25.0%
	Midterm colloquium	50.0%	75.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> Głowacki K., Onderka E.: Sieci trakcyjne. Bibice: EMTRAK 2002. Podoski J., Kacprzak J., Mysłek J.: Zasady trakcji elektrycznej. Warszawa: WKŁ 1980. Praca zbiorowa, red. Strojny J.: Trakcja elektryczna prądu stałego. Układy zasilania. Podręcznik INPE dla elektryków. Zeszyt 27.SEP-COSiW, Warszawa, 2009. Giętkowski Z., Karwowski K., Mizan M.: Diagnostyka sieci trakcyjnej. Gdańsk: Wyd. PG 2009/Biblioteka Cyfrowa Politechniki Gdańskiej. Adamski A.: Inteligentne systemy transportowe. Uczelniane Wydawnictwa Naukowo Techniczne AGH, Kraków 2003. Piecha J. (red.): Rejestracja i przetwarzanie danych w telematycznych systemach transportu. Monografia. Wyd. Politechniki Śląskiej, Gliwice 2003. Steimel A.: Electric Traction - Motion Power and Energy Supply.Oldenbourg Industrieverla 2007. Skibicki J.: Pojazdy elektryczne - część I i II. Gdańsk: Wydaw. PG, 2012. 104 s. ISBN 978-83-7348-418-4 Bartłomiejczyk M., Jarzębowicz L., Judek S., KarkosińskaBrzozowska N., Karwowski K., Mizan M., Skibicki J., Wilk A. (2020). Energetyka transportu zelektryfikowanego: Poradnik inżyniera.. Gdańsk: Politechnika Gdańska. Bartłomiejczyk M., Jakubowski A., Jarzębowicz L., Judek S., Karwowski K., Mizan M., Skibicki J., Wilk A. (2023). Energetyka transportu zelektryfikowanego. Zbiór zadań problemowych. Gdańsk Skibicki J.: Wizyjne metody pomiarowe w diagnostyce górnej sieci trakcyjnej. Gdańsk: Politechnika Gdańska, 2018.226 s. ISBN 978-83-7348-746-8 	
	Supplementary literature	<ol style="list-style-type: none"> 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. Czasopisma: Technika Transportu Szynowego, Elektrische Bahnen, Revue Generale des Chemins de Fer. Nowacki G. (red.): Telematyka transportu drogowego. Warszawa: ITS, 2008. 	
	eResources addresses	<p>Uzupełniające</p> <p>Adresy na platformie eNauczanie:</p> <p>ENERGETYKA I TELEMATYKA TRANSPORTU - Moodle ID: 42403 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42403</p>	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> Power systems of electric traction in the world. Methods for the calculation of traction power supply systems. Tracton energy storage. Telecommunication systems in transportation. 		
Work placement	Not applicable		

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