



## Subject card

Subject name and code	Electric traction and traction equipment, PG_00044662						
Field of study	Transport						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			3.0		
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. Jacek Skibicki					
	Teachers	dr inż. Aleksander Jakubowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	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		5.0		25.0	75
Subject objectives	The aim of the course is to acquire knowledge related to electric traction, its components and areas of use of individual electric traction systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U13] able to select tools and methods, carry out assessments and simple tests of transport infrastructure and means of transport to an extent required of the specialty / learning profile		The student is able to select an electric traction system for a given transport task. Is able to assess the advantages and disadvantages of individual technical solutions.		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W18] has proficiency in transport infrastructure as appropriate for their specialty		The student recognizes the elements of the electrotraction power system. Has knowledge about the operation of a traction vehicle. Is able to assess vehicle parameters in terms of suitability for a given transport task.		[SW1] Assessment of factual knowledge		
Subject contents	History of electric traction, traction power systems, areas of application. Traction power supply systems - power supply with direct and alternating voltage. Traction substations, contact lines, diagnostics of contact lines, traction vehicles, construction and variants. Basic operating states of a traction vehicle. Diesel-electric traction, advantages and disadvantages compared to network traction. Energy storage methods, energy storage tanks - on-board and stationary applications. Hydrogen vehicles. Vehicle drive systems. Non-traction vehicle needs. Characteristics of transport systems based on electric traction. Traction calculations (theoretical journey) - applications. Energy consumption of electric traction - methods of assessing and improving energy efficiency.						
Prerequisites and co-requisites	Basic knowledge of electrical engineering.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
			100.0%		20.0%		
	30 / 5 000 Wyniki tłumaczenia Tłumaczenie Colloquium on lecture content		60.0%		80.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Szelaǳ A.: Trakcja elektryczna - podstawy. OWPW 2019</li> <li>2. Praca zbiorowa: Trakcja elektryczna prądu stałego - układy zasilania. Podręcznik INPE zeszyt 27, 2009</li> <li>3. Podoski J. Kacprzak J. Mysłek J.: Zasady trakcji elektrycznej, WKiŁ 1980</li> <li>4. Głowaeki K. Onderka E.: Sieci trakcyjne. E.Onderka 2017</li> <li>5. Dąbrowski T.: Sieci i podstacje trakcyjne. WKiŁ 1989</li> <li>6. Frontczak F. Podstacje trakcyjne i ich zasilanie. KOW 1993</li> <li>7. Skibicki J. Pojazdy elektryczne cz. I i II. Wydawnictwo PG 2012 2014</li> <li>8. Karwowski K. (red): Energetyka transportu zelektryfikowanego - poradnik inżyniera. Wydawnictwo PG 2018</li> </ol>
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Podoski R. Trakcja elektryczna tom I i II. WK 1954</li> <li>2. Szelaǳ A. Drażek Z. Maciołek T.: Elektroenergetyka miejskiej trakcji elektrycznej. Spatium 2017</li> <li>3. Czapła J. Seruga W.: Trakcja elektryczna w transporcie. WKiŁ 1990</li> </ol>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	