



Subject card

Subject name and code	, PG_00053440						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject				2026/2027	
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	4	Language of instruction				Polish	
Semester of study	7	ECTS credits				8.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Electrified Transportation -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Leszek Jarzębowicz				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60		10.0		130.0	200
Subject objectives	The aim of the course is to acquire knowledge in selected issues of electromobility. The student will learn about the construction and operation of electric and hybrid vehicles, as well as the elements of infrastructure that enable the operation of these vehicles.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	K6_K01		He/she finds sources of information on selected aspects of the implementation of laboratory exercises.			[SK2] Assessment of progress of work	
	K6_W10		He/she lists the factors influencing the total energy consumption of an electric car.			[SW1] Assessment of factual knowledge	
	K6_U09		He/she selects the power and torque of the electric drive to obtain the appropriate maximum speed and initial acceleration.			[SU1] Assessment of task fulfilment	
	K6_U10		He/she designs a research scenario for the energy consumption of a hybrid or electric car to determine the factors influencing its energy consumption.			[SU1] Assessment of task fulfilment	

Subject contents	<p>Course content – lecture LECTURES: Traction electric drives. Energy consumption of electric vehicles. Hybrid electric cars. Electric cars charging. Electromechanical equipment of electric and hybrid motor vehicles. Electric energy storage devices. Construction and diagnostics of ignition and injection systems. Ecological aspects of automotive development. Vehicle traction control systems. Land transport infrastructure, standard and high-speed railway lines. Categories and types of roads, construction and elements of infrastructure, road junctions and intersections. Intermodal transport, transport containerization, transshipment infrastructure. Urban transport infrastructure, categories of streets, routing of tram lines, auxiliary infrastructure, metro and city rail lines, unconventional types of urban transport.</p> <p>EXERCISES: Vehicle movement. Electrical and energy calculations. Vehicle storage power supply. Passage simulation.</p> <p>LABORATORIES: Traction control of a multi-motor electric vehicle. Speed profile shaping. Energy consumption analysis of a train. ABS of an electric vehicle. Energy consumption analysis of a car. Mobile robot.</p>														
Prerequisites and co-requisites	Accomplished course of "Electrical engineering in transport".														
Assessment methods and criteria	<table border="1" data-bbox="448 640 1489 801"> <thead> <tr> <th data-bbox="448 640 794 674">Subject passing criteria</th> <th data-bbox="794 640 1141 674">Passing threshold</th> <th data-bbox="1141 640 1489 674">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 674 794 730">Laboratory - raports and preparation</td> <td data-bbox="794 674 1141 730">60.0%</td> <td data-bbox="1141 674 1489 730">30.0%</td> </tr> <tr> <td data-bbox="448 730 794 763">Lecture - tests</td> <td data-bbox="794 730 1141 763">60.0%</td> <td data-bbox="1141 730 1489 763">40.0%</td> </tr> <tr> <td data-bbox="448 763 794 801">Excercises - final test</td> <td data-bbox="794 763 1141 801">60.0%</td> <td data-bbox="1141 763 1489 801">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory - raports and preparation	60.0%	30.0%	Lecture - tests	60.0%	40.0%	Excercises - final test	60.0%	30.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Dentom T.: Automobile Electrical and Electronic Systems. Taylor & Francis, 2017. 2. Towpik K.: Infrastruktra transportu szynowego. OW Politechniki Warszawskiej, Warszawa, 2017. ISBN 978-83-7814-678-0 3. Hayes J.G., Goodarzi G.A.: Electric Powertrain. Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles. Wiley 2018. 4. Ehsani M., Gao Y., Longo S., Ebrahimi K.: Modern Electric, Hybrid Electric, and Fuel Cell Vehicles. 3rd Edition. CRC Press, 2018. 5. Siłka W.: Teoria ruchu samochodu. Warszawa: WNT 2002. 													
	Supplementary literature	<ol style="list-style-type: none"> 1. Skibicki J.: Pojazdy elektryczne. Część 1. Wydawnictwo PG, 2010 2. Skibicki J.: Pojazdy elektryczne. Część 2. Wydawnictwo PG, 2012 													
	eResources addresses														
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • List and describe standards used in electric vehicles charging stations in Europe. • Discuss the types and construction of hybrid combustion-electric cars. 														
Practical activites within the subject	Not applicable														

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