



Subject card

Subject name and code	, PG_00058643						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
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 Controlled Electric Drives -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Marcin Morawiec					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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	0.0		0.0		30
Subject objectives	The aim of the course is to discuss the basic issues related to electromobility, energy storage and hydrogen technologies.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_K71] is able to explain the need to apply knowledge from humanistic, social, economic or legal sciences in order to function in a social environment	The student is able to use knowledge in the field of humanities in the functioning of the social environment	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
	[K7_U71] is able to apply knowledge from humanistic, social, economic or legal sciences in order to solve problems	The student is able to combine knowledge from various fields, including the humanities, to achieve the assumed result	[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information
	[K7_W06] knows the extended issues of reliability of power equipment and diagnostics of defects in this equipment	The student has knowledge of the devices used in electromobility, energy storage and hydrogen systems	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
	[K7_U03] has the necessary preparation to work in an industrial environment, is prepared to undertake third degree studies, applies the principles of safety and hygiene	The student is prepared to take up professional work or further education at third-cycle studies	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	[K7_U04] is able to plan and perform experiments using measurements and computer simulations, together with interpretation of results, is able to present and evaluate the course and results of work in a team realizing an advanced engineering project, is able to use technical documentation and to create it independently	Development of a simulation of the selected system and analysis of the effects on its basis	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K7_U05] is able to integrate technical and economic analysis of the use of various energy technologies, including technologies using renewable energy sources and conventional and nuclear energy	The student is able to evaluate selected technologies from an economic point of view	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject	
Subject contents	1. Overview of the basic issues and phenomena occurring in electrical engineering.2. Introduction to electromobility - characteristics of the electric drive3. Range, charging method, converter systems used in electric vehicles4. Energy storage used in practice - general characteristics and functioning5. Basic hydrogen systems and their characteristics6. Application in practice.		
Prerequisites and co-requisites	Basic knowledge of electrical engineering.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory exercises	50.0%	80.0%
	Lecture	50.0%	20.0%

Recommended reading	Basic literature	<p>Kwiatkiewicz P., Szczerbowski R., Śledzik W.: Elektromobilność - środowisko infrastrukturalne i techniczne wyzwania polityki intraregionalnej, Wydawnictwo Naukowe FNCE, 2020.</p> <p>Jagiello A., Elektromobilność w kształtowaniu rozwoju drogowego, Wydawnictwo Uniwersytetu Gdańskiego, 2021.</p> <p>Sarniak M., Zasobniki energii w systemach fotowoltaicznych, https://depot.ceon.pl/bitstream/handle/123456789/9391/warunki_techiczne_pl_numer_12.pdf%20-%20zotero%20_attachment_37_.pdf?sequence=1</p> <p>Jelley N., Krótki kurs. Energetyka odnawialna, PWN 2022.</p> <p>Chmielniak T., Chmielniak T., Energetyka wodorowa, PWN 2020.</p>
	Supplementary literature	brak
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	-	
Work placement	Not applicable	