



## Subject card

Subject name and code	Electrochemical power sources, PG_00058348						
Field of study	Hydrogen Technologies and Electromobility						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study 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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Electrochemistry, Corrosion and Materials Engineering -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Artur Zieliński				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	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		8.0		72.0	125
Subject objectives	Familiarization with the principles of operation and practical implementation of various electrochemical energy sources.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W19] has knowledge of the properties of electrolyte solutions, electrode processes and some electrochemical processes relevant to industrial practice and the application of electrochemistry in practice		The student is able to design a medium-scale implementation of a selected electrochemical process.		[SW1] Assessment of factual knowledge		
	[K6_W21] has knowledge in the field of construction, principles of operation and use of electrochemical energy sources		The student is able to carry out diagnostics and optimization of a specific variant of an energy source.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U02] can work individually and in a team, can communicate using various techniques in a professional environment, as well as document and analyze the results of their work, can estimate the time needed to perform the entrusted task		The student is able to translate theoretical knowledge about the thermodynamics and kinetics of electrode processes into understanding the operation of various energy sources.		[SU4] Assessment of ability to use methods and tools		
Subject contents	Physicochemistry of electrode processes. Batteries. Supercapacitors. Fuel cells. Photovoltaic cells.						
Prerequisites and co-requisites	Electrochemistry, physical chemistry						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	lab		60.0%		50.0%		
	exam		60.0%		50.0%		

Recommended reading	Basic literature	Electrochemical Power Sources: Batteries, Fuel Cells, and Supercapacitors  By Vladimir S. Bagotsky, Alexander M. Skundin and Yury M. Volfkovich (A.N. Frumkin Institute of Physical Chemistry and Electrochemistry of the Russian Academy of Science, Russia), John Wiley & Sons Inc, New Jersey, USA, 2015, 372 pages, ISBN: 978-1-118-46023-6
	Supplementary literature	Publications from the JCR list
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Principles of operation of fuel cells  Corrosion cells	
Work placement	Not applicable	