



## Subject card

Subject name and code	Fundamentals of electrochemistry, PG_00058339						
Field of study	Hydrogen Technologies and Electromobility						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Hydrogen Technologies Center -> Vice-Rector for Development and Quality						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Kazimierz Darowicki					
	Teachers	dr hab. inż. Paweł Ślepski prof. dr hab. inż. Kazimierz Darowicki					
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	6.0		24.0		75
Subject objectives	Understanding the phenomenon of electrolytic dissociation. Distinguish between strong and weak electrolytes. What is the scale of electrochemical potentials and electrochemical kinetics.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[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 has basic knowledge of the basics of electrochemistry, can work in a team.			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyze information		
	[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 understands electrochemical phenomena relevant to industrial practice..			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U13] can use properly selected methods and devices enabling the measurement of basic quantities characterizing materials and technological processes	The student is able to perform electrochemical measurements.			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	<ol style="list-style-type: none"> <li>1. Electrolyte solutions,</li> <li>2. Conductivity of electrolyte solutions,</li> <li>3. Conductometry,</li> <li>4. Transport in electrolyte solutions,</li> <li>5. Electric potential,</li> <li>6. Internal potential,</li> <li>7. External potential</li> <li>8. Surface potential,</li> <li>9. Hydrogen electrode,</li> <li>10. SEM of the cell electrochemical,</li> <li>11. Electrode potential scale,</li> <li>12. pH measurement of potentiometry,</li> <li>13. Kinetics of the electrochemical reaction</li> </ol>											
Prerequisites and co-requisites	Fundamentals of general chemistry and mathematics.											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Subject passing criteria</th> <th style="width: 33%;">Passing threshold</th> <th style="width: 33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>lecture</td> <td>60.0%</td> <td>50.0%</td> </tr> <tr> <td>laboratory</td> <td>60.0%</td> <td>50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	lecture	60.0%	50.0%	laboratory	60.0%	50.0%
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	lecture	60.0%	50.0%									
laboratory	60.0%	50.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1- Adolf Kiszka Electrochemistry I Jonika WNT, 2000,</li> <li>2- Adolf Kiszka Electrochemistry II Elektrodyka WNT, 2001,</li> <li>3- Rudolf Holze, Experimental Electrochemistry, Wiley-vch, 2019</li> </ol>										
	Supplementary literature	not applicable										
	eResources addresses	Adresy na platformie eNauczanie:										
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1 -Charge transport in the electrolyte, types, examples.</li> <li>2- Influence of compound structure on the conductivity of the solution.</li> <li>3- Construction and operation of an electrochemical cell.</li> <li>4- Speed of electrode reactions.</li> </ol>											
Work placement	Not applicable											