



## Subject card

Subject name and code	Technical electrochemistry, PG_00058345						
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	3	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Electrochemistry, Corrosion and Materials Engineering -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Paweł Ślepski					
	Teachers	dr hab. inż. Paweł Ślepski					
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	7.0		48.0		100
Subject objectives	The aim of the course is for the student to master the knowledge of applications of electrochemical methods in industry. In addition, the student will master the ability to independently carry out electrochemical processes and analyses with industrial applications on a laboratory scale.						
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	Prepares and presents results from an electrochemical process.			[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment		
	[K6_U13] can use properly selected methods and devices enabling the measurement of basic quantities characterizing materials and technological processes	Controls selected technical electrochemical processes.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse 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	Selects the appropriate electrochemical technology to solve a technological problem.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>Lecture: Application of electrochemistry in corrosion monitoring and protection: electrochemical monitoring of corrosion rates, cathodic and anodic protection of metallic industrial structures. Electrochemical application of metallic coatings. Electrochemical wastewater treatment: electrocoagulation, electro-oxidation of organic compounds.</p> <p>Laboratory: Monitoring of corrosion rate by polarisation resistance method. Analysis of potentiodynamic curves to determine corrosion rate and type of control. Anodic and cathodic protection of metallic materials. Application of anodic and cathodic metallic coatings. Study of the effectiveness of the electrocoagulation process.</p>											
Prerequisites and co-requisites	<p>The student has a basic knowledge of the mathematics of physics and the fundamentals of electrochemistry. The student has the ability to perform laboratory experiments in electrochemistry.</p>											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="448 544 794 577">Subject passing criteria</th> <th data-bbox="794 544 1141 577">Passing threshold</th> <th data-bbox="1141 544 1487 577">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 577 794 611">written exam</td> <td data-bbox="794 577 1141 611">60.0%</td> <td data-bbox="1141 577 1487 611">60.0%</td> </tr> <tr> <td data-bbox="448 611 794 651">report</td> <td data-bbox="794 611 1141 651">100.0%</td> <td data-bbox="1141 611 1487 651">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	written exam	60.0%	60.0%	report	100.0%	40.0%
Subject passing criteria	Passing threshold	Percentage of the final grade										
written exam	60.0%	60.0%										
report	100.0%	40.0%										
Recommended reading	<table border="1"> <tr> <td data-bbox="448 656 794 943">Basic literature</td> <td colspan="2" data-bbox="794 656 1487 943"> <p>K. Jackowska, P. Krysinski; Applied Electrochemistry, De Gruyter, 2020</p> <p>R. Dylewski, W. Gnot, M. Gonet; Elektrochemia przemysłowa, WPŚ, Gliwice 1999.</p> <p>H. Bala; Korozja materiałów - teoria i praktyka, WIPMiFS, Częstochowa 2000.</p> </td> </tr> <tr> <td data-bbox="448 943 794 976">Supplementary literature</td> <td colspan="2" data-bbox="794 943 1487 976">journal: "Journal of Applied Electrochemistry", Springer</td> </tr> <tr> <td data-bbox="448 976 794 1016">eResources addresses</td> <td colspan="2" data-bbox="794 976 1487 1016">Adresy na platformie eNauczanie:</td> </tr> </table>			Basic literature	<p>K. Jackowska, P. Krysinski; Applied Electrochemistry, De Gruyter, 2020</p> <p>R. Dylewski, W. Gnot, M. Gonet; Elektrochemia przemysłowa, WPŚ, Gliwice 1999.</p> <p>H. Bala; Korozja materiałów - teoria i praktyka, WIPMiFS, Częstochowa 2000.</p>		Supplementary literature	journal: "Journal of Applied Electrochemistry", Springer		eResources addresses	Adresy na platformie eNauczanie:	
Basic literature	<p>K. Jackowska, P. Krysinski; Applied Electrochemistry, De Gruyter, 2020</p> <p>R. Dylewski, W. Gnot, M. Gonet; Elektrochemia przemysłowa, WPŚ, Gliwice 1999.</p> <p>H. Bala; Korozja materiałów - teoria i praktyka, WIPMiFS, Częstochowa 2000.</p>											
Supplementary literature	journal: "Journal of Applied Electrochemistry", Springer											
eResources addresses	Adresy na platformie eNauczanie:											
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• electrochemical protection of steel in a sulphuric acid environment</li> <li>• metallization - acid baths</li> <li>• electro-oxidation of paracetamol</li> </ul>											
Work placement	Not applicable											