GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00065844		
Field of study	Materials Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Specialty subject group 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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jacek Ryl	
	Teachers	prof. dr hab. inż. Jacek Ryl	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	15.0	0.0	0.0	15

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	15	4.0	31.0	50

Subject objectives

The aim of the course is to familiarize the student with practical applications for the electrolysis process. The laboratories will address selected, most important issues in which electrolyzers are currently used.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W06] Knows the theoretical basics the functioning of scientific equipment in the fields of science and scientific disciplines relevant to materials engineering.	The student knows the types of electrolyzers, their applications in various fields of science and industry	[SW1] Assessment of factual knowledge
[K7_U04] Can undertake a detailed analysis of the obtained results and develop a technical report or presentation, also in English.	The student is able to analyze the effectiveness of using electrolyzers in various fields of materials engineering.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K7_U03] Can formulate a research hypothesis, design an experiment needed to prove it and use properly selected measuring and laboratory methods.	The student is able to select electrolysis conditions and electrodes based on specific experimental expectations and verify the effectiveness of the selection	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

Course content – laboratory
Lecture: The three-hour lecture is an introduction to the phenomenon of electrolysis, introducing the nomenclature, discussing the areas of use of electrolysis, describing the parameters characteristic of electrolyzers (design, electrolyte flow, electrodes, etc.).

Lab: Four three-hour labs will cover the following areas: 1. Electrolytic hydrogen production 2. Water pollution purification 3. Environmental diagnostics and electrochemical sensors 4. Conversion coatings

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basic course in electrochemistry and inorganic chemistry Basic course in electrochemistry and inorganic chemistry</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>laboratory</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">P. Atkins - Physical Chemistry</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Articles in JCR Journals</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">define the roles of electrodes and the selection of electrolyzer operating conditions

what is the effect of electrocatalytic hydrogen evolution

how are conversion coatings formed</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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