GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fuel cells and low temperature electrolysers, PG_00058352		
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 Corrosion and Electrochemistry -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Łukasz Gaweł	
	Teachers	dr inż. Łukasz Gaweł	

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

The aim of the course is to familiarize students with low-temperature electrolysers and fuel cells.During the course, students will become familiar with the construction of cells and electrolyzers.They learn the principles of operation and the impact of operating parameters on the efficiency of fuel cells, i.e. temperature, flow rate, humidification.They will become familiar with basic measurement techniques for evaluating fuel cells performance.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W21] has knowledge in the field of construction, principles of operation and use of electrochemical energy sources	Student is able to identify individual elements of a low-temperature fuel cell. Is able to describe the principle of operation and areas of application of low-temperature fuel cells.	[SW1] Assessment of factual knowledge
[K6_W20] has knowledge in the field of construction, principles of operation and use of electrolysers	Student is able to identify individual elements of the electrolyzer. Is able to describe the principle of operation and areas of application of low-temperature electrolysers.	[SW1] Assessment of factual knowledge
[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	Student is able to use measurement techniques and solve problems related to fuel cells and electrolyzers.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents	Basics of construction of low-temperature electrolysers and fuel cells.Electrode reactions, cell emfTypes of losses in low-temperature cells and electrolysersThe influence of temperature and pressure on the operation of cells.Basic measurement techniques for assessing the properties of electrolyzers and low-temperature cells.Application of low-temperature cells and electrolysers.
Prerequisites and co-requisites	Knowledge of the basics of electrochemistry and technical electrochemistry.Knowledge of the basics of electrical engineering.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	60.0%	60.0%
Lectures	60.0%	40.0%

Recommended reading

Basic literature	1. J. Larminie, A. Dicks ,,Fuel cell systems explained, Willey, 2003. 2. K. Kordesh, G. Simader ,,Fuel cells and their applications, VCH, 2001
Supplementary literature	1. P. W. Atkins: ,,Chemia fizyczna", PWN, Warszawa 2001.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	The influence of temperature on cell efficiencyThe influence of reactant flow rates on efficiency.Describe the current-voltage curve of the cell.Write down the reactions taking place in the electrolyzer/cell
Work placement	Not applicable

Document generated electronically. Does not require a seal or signature.