



Subject card

Subject name and code	, PG_00057504						
Field of study	Nanotechnology						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Ryl					
	Teachers	dr hab. inż. Jacek Ryl					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	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	0.0		0.0		45
Subject objectives	The aim of the course is to familiarize students with the role of electrochemical processes in the world of science and industry, including in particular the possibilities of using electrode phenomena in practice, e.g. in electricity storage technologies, mechanisms of catalyzing chemical processes, mechanisms of electrochemical sensors operation, anti-corrosion technologies, water and wastewater treatment technologies, synthesizing thin-film systems, etc. Electrochemical measurement techniques will be presented and discussed as part of the course.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_K05						
	K6_U06						
	K6_W07						
Subject contents	<ul style="list-style-type: none">• Fundamentals of electrochemistry• DC measurements• AC measurements• Electroanalysis, electrochemical sensors• Electrochemical energy storage devices• Fuel cells• Photo and electrocatalysis• Electrochemical water treatment• Corrosion and protection against corrosion• Electrochemical techniques for applying thin layers						
Prerequisites and co-requisites	Knowledge of the structural properties of materials, solid state physics, chemistry, surface physico-chemistry. Basics in electrical engineering and physical chemistry are valuable.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Lecture module		60.0%		50.0%		
	Practical training module		60.0%		50.0%		

Recommended reading	Basic literature	P. Atkins - Chemia Fizyczna K. Pigoń, Z. Ruziewicz - Chemia Fizyczna A. Czerwiński - Akumulatory, baterie, ogniwa
	Supplementary literature	Publications in journals from the ISI list, presented during lectures
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	What is the role of each electrode in the measuring system? The role of diffusion in electrochemical processes Describe the mechanisms of selected forms of anti-corrosion protection Why are lithium ion batteries the most widely used today, what are the alternatives? Diversify anodic and cathodic electrochemical coating technologies	
Work placement	Not applicable	

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