



Subject card

Subject name and code	Electrochemical measurement techniques, PG_00039696						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	February 2022		Academic year of realisation of subject			2021/2022	
Education level	second-cycle studies		Subject group			Optional 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	1		Language of instruction			Polish	
Semester of study	1		ECTS credits			3.0	
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. Artur Zieliński				
	Teachers		dr hab. inż. Artur Zieliński				
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		5.0		25.0	75
Subject objectives	Presentation and discussion of the principles of classical electrochemical experiments.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_K01		The student is able to design the electrochemical measurement with the use of various measurement techniques.		[SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work		
	K7_W06		The student is able to translate theoretical knowledge into measurable application effects.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	K7_U04		The student is able to perform the correct processing of experimental data.		[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		
	K7_W01		Student is able to choose a measurement method adequate to a specific task.		[SW1] Assessment of factual knowledge		
Subject contents	Electrochemical cell set-up. Application of electronic devices in electrochemistry (potentiostat). Diffusional mass transport. Solutions of Fick's equations for different types of experiment. Activation control of electrode process. Potentiostatic, potentiodynamic, galvanostatic, galvanodynamic measurement. Principles of chronovoltamperometry.						
Prerequisites and co-requisites	Knowledge of electrochemistry fundamentals						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Written exam		60.0%		50.0%		
	Practical exercise		100.0%		50.0%		
Recommended reading	Basic literature		A. Kisza, Elektrochemia tom 2. Elektrodyka, WNT, Warszawa, 2001				
	Supplementary literature		Z. Galus, Teoretyczne podstawy elektroanalizy chemicznej, PWN, Warszawa, 1977 A. J. Bard, L. R. Faulkner, Electrochemical methods, fundamentals and applications, John Wiley and Sons Inc., New York, 2001				
	eResources addresses						

Example issues/ example questions/ tasks being completed	When is it better to use a standard rate constant and when is the current exchange? What is the Cottrell experiment? What is the role of supporting electrolyte? Discuss the shape of typical chronovoltometric graphs.
Work placement	Not applicable