



Subject card

Subject name and code	Electrochemistry I, PG_00039804						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
Education level	second-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	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
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		prof. dr hab. inż. Kazimierz Darowicki				
	Teachers		prof. dr hab. inż. Kazimierz Darowicki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
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	30		1.0		19.0	50
Subject objectives	familiarizing students with the phenomena occurring at the interface between a metallic electrode and an electrolyte						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_U03		The student is able to put forward a research hypothesis and apply a properly selected measurement method.		[SU4] Assessment of ability to use methods and tools		
K7_W03		Familiarizing students with the phenomena occurring at the interface between the metallic electrode and the electrolyte.		[SW3] Assessment of knowledge contained in written work and projects			
Subject contents	-Inner, outer and surface potential. -Double electric layer and its structure: Helmholtz, Stern and Guy-Chapman models. -Adsorption at electrodes: surface excess, adsorption isotherms, zero charge potential. - Chemical and electrochemical processes. -Determination of thermodynamic parameters and equilibrium conditions. -Electrode reaction current dependence of potential: Butler theory and Marcus theory. -Charge transfer coefficient: phenomena occurring inside a sphere and outside a sphere. -Electron tunneling. - Activation and diffusion control of electrochemical processes. -Multi-electrode processes. -Hydrogen evolution reaction on solid electrodes - kinetic analysis. -Chloride evolution reactions - kinetic analysis. - Electrochemical dissolution of iron.						
Prerequisites and co-requisites	Basics of thermodynamics and chemical kinetics.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Exam		60.0%		100.0%		
Recommended reading	Basic literature		A. Kiszka, Elektrochemia t.I i II, WNT, Warszawa 2000 Z. Galus, Elektroanalityczne metody wyznaczania stałych fizykochemicznych, PWN Warszawa 1979 Z. Galus, Teoretyczne podstawy elektroanalizy chemicznej. PWN Warszawa 1977				
	Supplementary literature		No requirements				
	eResources addresses						

Example issues/ example questions/ tasks being completed	Chemical and electrochemical processes determination of thermodynamic parameters activation and diffusion control
Work placement	Not applicable