GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	SPECTROSCOPY TECHNIQUES IN CORROSION ANALYSIS, PG_00064353
Field of study	Corrosion

Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study
			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	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 Corrosion and Electrochemistry -> Faculty of Chemistry
Name and surname of lecturer (lecturers)	Subject supervisor — dr inż. Łukasz Gaweł
	Teachers

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	22.0	75

Subject objectives	The goal is to familiarize students with various spectroscopic tools: division, operating conditions and interpretation of measurement results with particular emphasis on potential application in the field of corrosion protection.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] has the knowledge of materials necessary to describe and understand the relationship between chemical composition and physical properties	The student understands the general laws on which the techniques discussed are based. The student is able to select a technique for a specific need, knows its possibilities and limitations.	[SW1] Assessment of factual knowledge
	[K7_K01] critically evaluates the content of scientific and practical problems	The student is able to search for information on the interpretation of measurement results and the computational models used in available literature databases.	[SK5] Assessment of ability to solve problems that arise in practice
	[K7_U04] predicts the properties of the materials obtained and the processes involving them, based on knowledge of corrosion and related fields	The student recognizes spectroscopic methods used to study processes occurring on the surfaces of solids.	[SU4] Assessment of ability to use methods and tools
	[K7_U03] designs innovative technological solutions for obtaining useful goods based on the latest knowledge in accordance with the current scientific literature	The student is able to select a technique needed to obtain information on the identification of the tested material, corrosion hazard, corrosion mechanism, degree of degradation and design an experiment using the selected method.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

Subject contents	Lectures and laboratories will cover: electrochemical impedance spectroscopy (EIS), dynamic electrochemical impedance spectroscopy (DEIS), nonlinear electrochemical impedance spectroscopy (NLEIS), X-ray photoelectron spectroscopy (XPS) and Auger photoelectron spectroscopy (AES), Raman spectroscopy, X-ray microanalysis (EDX), acoustic spectroscopy.

Prerequisites and co-requisites	The basic knowledge on solid state physics, electrotechnics, electrochemistry and corrosion science		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratories	60.0%	60.0%
	lecture	60.0%	40.0%
Recommended reading	Basic literature	R. Feynmann, Feynmana wykłady z fizyki. T. 1, cz. 2, PWN, Warszawa, 2012 R. Kelsall, I. Hamley, M. Geoghegan, Nanotechnologie, PWN, Warszawa, 2008 J. Watts, J. Wolstenholme, Surface analysis by XPS and AES, Wiley, New York, 2003	
	Supplementary literature	articles in JCR journals, sources on eNauczanie website	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Methods for determining the corrosion rate,Methods for assessing the degree of degradation of: coating system, passive layer, material structureMethods for identification of composition of metals and alloysMethods for evaluation of the mechanism and dynamics of corrosion processes		
Work placement	Not applicable		

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