



Subject card

Subject name and code	Spectroscopy techniques in corrosion analysis, PG_00048990						
Field of study	Corrosion						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
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	2	ECTS credits			4.0		
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 inż. Łukasz Gawel					
	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	5.0	50.0	100		
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_U01	The student knows how to search for information on the interpretation of measurement results and the use of fitting procedures in available literature sources.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information		
	K7_U05	The student can assess the possibility to utilize spectroscopic techniques in order to obtain information about corrosion risk or to determine mechanism of degradation.			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
	K7_U03	The student is able to select the technique needed to obtain information on identification of the investigated material, corrosion hazard and its mechanism, degree of material failure. Student is able to design an experiment using the chosen method.			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		
	K7_W04	The student recognizes spectroscopic methods used to study surface processes. The student understands their principles and can choose the technique for a specific need, knows its possibilities and limitations.			[SW1] Assessment of factual knowledge		

Subject contents	The lectures and laboratories will discuss multiple spectroscopic tools: electrochemical impedance spectroscopy (EIS), X-ray photoelectron spectroscopy (XPS) and Auger spectroscopy (AES), secondary ion mass spectrometry (SIMS), infrared spectroscopy (FTIR) and UV-VIS, Raman spectroscopy, energy dispersive X-ray spectroscopy (EDX), spectroscopic ellipsometry and 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%	50.0%
	lecture	60.0%	50.0%
Recommended reading	Basic literature		<p>R. Feynmann, Feynmana wykłady z fizyki. T. 1, cz. 2, PWN, Warszawa, 2012</p> <p>R. Kelsall, I. Hamley, M. Geoghegan, Nanotechnologie, PWN, Warszawa, 2008</p> <p>J. Watts, J. Wolstenholme, Surface analysis by XPS and AES, Wiley, New York, 2003</p>
	Supplementary literature		articles in JCR journals, sources on eNauczanie website
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Methods for determining the corrosion rate,</p> <p>Methods for assessing the degree of degradation of: coating system, passive layer, material structure</p> <p>Methods for identification of composition of metals and alloys</p> <p>Methods for evaluation of the mechanism and dynamics of corrosion processes</p>		
Work placement	Not applicable		