GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microscopic test methods, PG_00039689		
Field of study	Materials Engineering, Materials Engineering		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2023/2024
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	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	dr inż. Łukasz Gaweł	
	Teachers	dr inż. Łukasz Gaweł	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	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	5.0	15.0	50

Subject objectives

The goal is to make students familiar with different microscopic techniques:
- they should be able to distinguish pros and cons of each technique and capable to select technique for specific task
- they should be able to use obtained knowledge for proper imaging of samples
- students should know basic parameters related with image quality

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_U06	Student is able to assess the possibility of using new measurement techniques as well as modification of existing techniques in order to increase the obtained analytical information.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
K7_W06	Student understands the basic terms and concepts associated with microscopic techniques. Understands the general laws on which the discussed techniques are based. Student is able to choose a technique for a particular need, knows its possibilities and limitations. Knows the development trend of microscopic techniques.	[SW1] Assessment of factual knowledge
K7_K01	Student is capable to correctly choose the measurement tool for a specific need, and ask for help in the analysis and interpretation of test results. He is aware of the development of measurement techniques.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents

Lectures: evolution of microscopy techniques, optical microscopy, metalographic, confocal and fluorescent, Raman microscopy, scanning techniques - SEM, STM, AFM and similar, spectroscopic mapping, XPS AES and ellipsometry, electrochemical mapping DEIS

Prerequisites and co-requisites

Good understanding of basic physics, in particular optics. Communication in english is adviced.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		60.0%	10.0%
		60.0%	50.0%
		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 from JCR list, materlas from http://www.e-korozja.pl	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Use of various microscopes, elimination of image defects, Improvement of resolution and contrast Sample preparation Selection of technique for given samples		
Work placement	Not applicable		