

SDAŃSK UNIVERSITY 的 OF TECHNOLOGY

Subject card

Subject name and code	Light and Electron Microscopy, PG_00039769							
Field of study	Materials Engineering, Materials Engineering, Materials Engineering							
Date of commencement of studies	October 2021		Academic year of realisation of subject			2022/2023		
Education level	first-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	2		Language of instruction			Polish		
Semester of study	4		ECTS credits			3.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Zakład Materiałoznawstwa I Technologii Materiałowych -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology					als		
Name and surname	Subject supervisor		dr hab. inż. Marek Szkodo					
of lecturer (lecturers)	Teachers		dr inż. Alicja Stanisławska					
			dr hab. inż. Marek Szkodo					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
of instruction	Number of study 15.0 hours		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 classes include plan		didactic Participation in ed in study consultation hours		Self-study SUM			
	Number of study 30 hours		5.0		40.0 75		75	
Subject objectives	The purpose of the course is to familiarize students with the construction, principle of operation and ways of using light and electron microscopes. Students also gain knowledge about the preparation of specimens for microscopic studies using different types of microscopes and also learn the basics of computer image analysis.							
Learning outcomes	Course outcome		Subject outcome			Method of verification		
	K6_W06		Able to use image analysis software and perform computer image transformations to obtain information about the structural components present in the analyzed image.			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	К6_К01		Can solve problems that occur in practice, related to conducting analysis of the structure of engineering materials.			[SK5] Assessment of ability to solve problems that arise in practice		
	K6_U01		Can calculate the resolving power of different types of microscopes and knows their research capabilities and limitations. Can prepare a sample for metallographic testing.			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	K6_U02		Able to select a suitable eyepiece for the selected objective and also able to choose a suitable method of obtaining contrast on the optical path depending on the purpose of microscopic observation.			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	K6_W04		He knows the construction and principle of operation of various microscopes and how to use them to obtain information about the structure and properties of engineering materials.			[SW2] Assessment of knowledge contained in presentation		

Subject contents	Construction and principle of operation of an optical microscope. Types of illuminators in light microscopes. Methods of obtaining contrast in light microscopes. Concepts of resolving power, objective aperture, total and usable magnification of a microscope. Selection of eyepiece for the selected objective. Methods of preparing specimens for microscopic examination. Construction of electron microscopes. Physical phenomena occurring when the electron beam interacts with the material under study. Contrast in a transmission electron microscope. Preparation of specimens for testing on TME.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Passing colloquium at the end of lectures	50.0%	100.0%				
Recommended reading	Basic literature 1.D. Williams, C.B. Carter- Transmission Electron Microscopy, Plenum Press, New York, 1996 I 2009 (tom 1-4). 2. J.I. Goldstein, D.E. Newbury i inni: Scanning electron microscopy @ X ray microanalysis, Plenum Press, NY, 1992, drugie wydanie 1995						
	Supplementary literature	 D. Williams, C.B. Carter- Transmission Electron Microscopy, Plenum Press, New York, 1996 I 2009 (tom 1-4). J.I. Goldstein, D.E. Newbury i inni: Scanning electron microscopy X ray microanalysis, Plenum Press, NY, 1992, drugie wydanie 1995 					
	eResources addresses	Adresy na platformie eNauczanie:					
		Mikroskopia świetlna i elektronowa https://enauczanie.pg.edu.pl/mood	ι sem. IV 2023 - Moodle ID: 30644 lle/course/view.php?id=30644				
Example issues/ example questions/ tasks being completed	 Draw a diagram of a light microscope. Draw the Nachet illuminator and mark the course of light rays passing through it. List the ways of obtaining contrast on the optical path in light microscopes. What information can be obtained from analyzing the shape of digestive cavities. What are the morphological transformations of the image. 						
Work placement	Not applicable						