



Subject card

Subject name and code	Structural Research of Materials, PG_00039768						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2021/2022		
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	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marek Szkodo				
	Teachers		dr inż. Alicja Stanisławska dr hab. inż. Marek Szkodo				
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						
	Adresy na platformie eNauczanie: Badania strukturalne materiałów - Moodle ID: 22915 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=22915						
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		40.0	75
Subject objectives	The aim of the course is to familiarize students with the methods of examining the microstructure of engineering construction materials, mainly with microscopic methods.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U02		The student is able to use an optical microscope to choose the appropriate method of examining the microstructure of engineering materials		[SU5] Assessment of ability to present the results of task		
	K6_U01		The student is able to choose the appropriate method of preparing a material sample to determine its microstructure.		[SU4] Assessment of ability to use methods and tools		
	K6_K01		The student understands the relationship between the microstructure of engineering materials and their properties, and is aware of what methods can be used to determine the microstructure of materials.		[SK5] Assessment of ability to solve problems that arise in practice		
	K6_W06		The student knows the structure of optical and electron microscopes and knows how to prepare material samples to determine their microstructure using various microscopes.		[SW1] Assessment of factual knowledge		
	K6_W04		The student knows the structure of optical and electron microscopes and knows how to use these tools to determine the microstructure of engineering materials.		[SW1] Assessment of factual knowledge		

Subject contents	Construction and operation of an optical microscope and various electron microscopes. Resolving power, total and useful magnification of the microscope, the aperture of the objective and the method of selecting the eyepiece for the selected objectives. Methods of obtaining contrast in the light and electron microscopy. Preparation of samples for research on the light and electron microscope.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	colloquium which includes the lectures	50.0%	50.0%
	passing all laboratory exercises	100.0%	50.0%
Recommended reading	Basic literature	Transmission Electron Microscopy: A Textbook for Materials Science: by C. Barry Carter David B. Williams Scanning Electron Microscopy and X-Ray Microanalysis. A Text for Biologists, Materials Scientists, and Geologists: Goldstein, J., Newbury, D.E., Echlin, P., Joy, D.C., Romig Jr., A.D., Lyman, C.E., Fiori, C., Lifshin, E. Imaging Optics. Joseph Braat, Peter Török	
	Supplementary literature	Introduction to Optical Microscopy. Jerome Mertz	
	eResources addresses	Badania strukturalne materiałów - Moodle ID: 22915 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22915	
	Example issues/ example questions/ tasks being completed	Draw a diagram of the optical microscope List the methods of obtaining contrast on the optical microscope List the stages of making extraction films	
Work placement	Not applicable		