



Subject card

Subject name and code	MICROSCOPY IN ENVIRONMENTAL MONITORING, PG_00065980						
Field of study	Green Technologies						
Date of commencement of studies	February 2027		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		English		
Semester of study	1		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Polymer Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Justyna Kucińska-Lipka				
	Teachers						
Lesson types	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		2.0		18.0	50
Subject objectives	To acquaint students with the basics and methods of microscopic research used in the assessment of the quality of the broadly understood environment.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_K01] is aware of the problems related to the profession of engineer, is able to assess the effects of the activities performed		The student has knowledge of how to obtain data on the method of monitoring the quality of the environment using various microscopic methods and is able to draw conclusions about the quality of the environment based on the results of microscopic examinations.		[SK2] Assessment of progress of work		
	[K7_U02] selects analytical, simulation and experimental methods for research and analysis of environmental pollution using appropriately selected equipment and software		The student is able to propose and justify the use of appropriate microscopic research methods related to monitoring the quality of the external environment and at workplaces.		[SU5] Assessment of ability to present the results of task		
	[K7_W03] identifies equipment used in environmental pollution analysis, industrial waste purification and neutralization technology, and water and sewage management, necessary for designing and supervising environmentally friendly technologies		The student knows how to operate various types of microscopes used in environmental monitoring and is able to prepare a microscopic research plan to determine and monitor the type of environmental pollution in terms of environmentally friendly technologies		[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
Subject contents	Course content – lecture Introduction to optical and electron microscopy. Types of air pollutants and PM2.5, 5 and 10 particulate monitoring - preparation of test preparations and analysis of microscopic observation results (dust of various origins, including asbestos). The use of diatom classification analysis on the basis of microscopic examination to assess the quality of various water bodies (lakes, rivers, oceans, etc.). Microscopic examination of soil and assessment of its quality. Preparation and microscopic analysis of biological samples. Basics of environmental monitoring with the use of polarization, confocal and atomic force microscopy.						

Prerequisites and co-requisites	General basics of physics and chemistry		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written and oral test	60.0%	60.0%
	Laboratory	60.0%	40.0%
Recommended reading	Basic literature	Methods in chemical and mineral microscopy / by Essam E. El-Hinnawi. Hinnawi, Essam E. Amsterdam [etc.] : Elsevier Publishing Company, 1966. Opis fizyczny IX, [1], 222 s. : il. ; 23 cm. Principles and techniques of elektron microscopy : biological applications. Vol. 1 / M. Arif Hayat. Hayat, M. Arif (1936-). New York [etc.] : Van Nostrand Reinhold Company, cop. 1970. XV, 412 s. : il. ; 24 cm	
	Supplementary literature	Atomic force microscopy / Peter Eaton, Paul West.Eaton, Peter Jonathan. Oxford : Oxford University Press, 2011.Repr.VIII, 248 s., [4] s. tabl. : il. (w tym kolor.) ; 26 cm	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Asbestos microscopy. Dust electronography and dentification. - lab Microscopic analysis of emulsions in oily sewage - lab. Detection of microplastics in soil.		
Practical activites within the subject	Not applicable		

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