GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Microscopy in Environmental Monitoring, PG_00065929		
Field of study	Green Technologies		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2024/2025
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	Polish
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		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Kucińska-Lipka	
	Teachers	dr hab. inż. Justyna Kucińska-Lipka dr inż. Maciej Sienkiewicz	

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	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_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 different 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.	[SW3] Assessment of knowledge contained in written work and projects
[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	[SU4] Assessment of ability to use methods and tools
[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.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	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	The fundamental knowledge in physics and chemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written and oral egzam	60.0%	60.0%
laboratory	60.0%	40.0%

Recommended reading

Basic 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 c 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.Adres wydawniczy Oxford : Oxford University Press, 2011. Wydanie Repr.Opis fizyczny VIII, 248 s., [4] s. tabl. : il. (w tym kolor.) ; 26 cm
eResources addresses	Adresy na platformie eNauczanie:

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.
Work placement	Not applicable

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