



Subject card

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| Subject name and code | MICROSCOPY IN ENVIRONMENTAL MONITORING, PG_00065980 | | | | | | |
| 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 | | 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 | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | | dr hab. inż. Justyna Kucińska-Lipka | | | | |
| | Teachers | | | | | | |
| 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_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 | 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. | | | | | | |

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| 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 | 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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