



Subject card

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|---|--|---|----------|-------------------------------------|--|------------|-----|
| Subject name and code | , PG_00037591 | | | | | | |
| Field of study | Green Technologies | | | | | | |
| 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 | | | English | | |
| Semester of study | 3 | ECTS credits | | | 6.0 | | |
| Learning profile | general academic profile | Assessment form | | | assessment | | |
| Conducting unit | Department of Analytical Chemistry -> Faculty of Chemistry | | | | | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Tomasz Majchrzak | | | | | |
| | Teachers | dr inż. Tomasz Majchrzak dr hab. inż. Rafał Grubba dr inż. Natalia Jatkowska dr inż. Ilona Kłosowska-Chomiczewska prof. dr hab. inż. Andrzej Wasik dr inż. Małgorzata Rutkowska Chintankumar Padariya dr hab. Christian Jungnickel dr hab. inż. Agnieszka Pladzyk | | | | | |
| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
| | Number of study hours | 30.0 | 0.0 | 30.0 | 0.0 | 0.0 | 60 |
| | 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 | 60 | | 15.0 | | 75.0 | 150 |
| Subject objectives | Familiarize students with the basics of chemical processes occurring in the natural environment, physical chemistry of the atmosphere, water and soil. Presentation of geochemical cycles of the most important elements in the environment. Familiarization with the most important environmental pollutants, their sources and methods of detection. | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants | The student has basic knowledge in the field of soil, air and water protection against pollution and the theoretical basis of methods and types of apparatus used in the analysis of environmental pollution. | [SW1] Assessment of factual knowledge |
| | [K6_W02] has a basic knowledge of chemistry including general chemistry, inorganic, organic, physical, analytical, including the knowledge necessary to describe and understand the phenomena and chemical processes occurring in the environment; measurement and the determination of the parameters of these processes. | The student has basic knowledge in the field of chemistry necessary to describe and understand phenomena and chemical processes occurring in the natural environment. Knows the basics of the methods used for measuring the level of environmental pollution. | [SW1] Assessment of factual knowledge |
| | [K6_U04] capable of formulating and solving design tasks in the field of environmental technology to recognize their non-technical aspects, including environmental, economic and legal. Is capable of applying the principles of occupational health and safety. Is able to make initial assessment of engineering solutions and actions | The student notices non-technical, including environmental, aspects of technologies used in environmental protection. Applies the principles of occupational health and safety. | [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools |
| Subject contents | Atmospheric chemistry. Aquatic chemistry. Soil chemistry. Persistent organic pollutants in the environment. Carbon cycle. Nitrogen cycle. Phosphorus cycle. Oxygen and sulfur cycle. The role of the chemical elements in living organisms. "Heavy" metals and micronutrients. Environmental analytics. Methods of measuring the degree of pollution. Remote pollution measurement methods. | | |
| Prerequisites and co-requisites | Passed course of Inorganic Chemistry | | |
| Assessment methods and criteria | Subject passing criteria | Passing threshold | Percentage of the final grade |
| | Laboratory reports | 60.0% | 30.0% |
| | Written exam | 60.0% | 70.0% |
| Recommended reading | Basic literature | 1. Gary W vanLoon and Stephen J Duffy, Environmental Chemistry, Oxford University Press | |
| | Supplementary literature | 1. S. Manahan, Environmental Chemistry, CRC Press, 2009 | |
| | eResources addresses | Adresy na platformie eNauczanie: | |
| Example issues/ example questions/ tasks being completed | | | |
| Work placement | Not applicable | | |