Annex No. 5

to Ordinance No. 21/2019

**COURSE/MODULE SYLLABUS FOR UNIVERSITY COURSES/PhD STUDIES**

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|  | Course/module name in Polish and English  Environmental geochemistry in practice/Geochemia środowiska w praktyce | | |
|  | Discipline  Earth and Environmental Science | | |
|  | Language of instruction  English | | |
|  | Teaching unit  Faculty of Earth Science and Environmental Management, Institute of Geological Sciences, Department of Isotopic and Applied Geology | | |
|  | Course/module code  USOS | | |
|  | Type of course/module *(mandatory or optional)*  optional | | |
|  | Field of studies (major, if applicable)  Geology (spec. Applied Geoscience) | | |
|  | Level of higher education *(undergraduate (I cycle), Master’s (II cycle), 5 year uniform Master’s studies)*  Master’s (II cycle) | | |
|  | Year of studies *(if applicable*)  II | | |
|  | Semester *(winter or summer)*  winter | | |
|  | Form of classes and number of hours  Lectures: 14  Lab classes:14  Field classes:14  Teaching methods  Multimedia lecture, discussion, practical exercises, individual work, group work, preparation of reports. | | |
|  | Name, title/degree of the teacher/instructor  Coordinator: Dr Marta Jakubiak  Lecturer: Dr Marta Jakubiak, Prof. zw. dr hab. Mariusz Jędrysek, Dr Wojciech Drzewicki  Classes instructor: Dr Marta Jakubiak, Dr Wojciech Drzewicki  Field classes instructor: Dr Marta Jakubiak, Dr Wojciech Drzewicki | | |
|  | Course/module prerequisites, in terms of knowledge, skills, social competences  Basic knowledge and skills in the field of geology, environmental protection, chemistry and geochemistry | | |
|  | Course objectives  The aim of the course is understanding and practical application of knowledge about the circulation elements in nature, scattering and concentration of chemical elements in various spheres of Earth Ability to apply geochemical techniques as a modern and effective tool in solving problems in the field of geology and environmental protection. | | |
|  | Course content  Lectures:  Environmental Geochemistry the definition of the purpose and scope of the study. The basic elements of the environment and their relationship. Atmosphere, physical characteristics and distribution. Elements of meteorology. The chemical composition of the atmosphere, chemical and photochemical reactions. Transport of pollutants, physico-chemical transformations of natural and anthropogenic dusts occurring in the atmosphere. Photochemical smog. Acid rain. The greenhouse effect. The formation and destruction of the ozone layer. Hydrosphere. Physical and chemical properties of water. The complexes and chelates. The role of colloids in geochemical processes. Living organisms in the water. Inorganic and organic water pollution. Lithosphere, chemical and mineral composition. Weathering processes of physical and chemical. The impact of human activity on the geochemistry of the lithosphere. Biosphere. The chemical composition of living organisms. The share of the biosphere in geochemical processes. Pollution as a threat to living organisms. Geochemical and its balance disorders. Geochemical barriers and their use in environmental protection. Elements of environmental toxicology.  Laoratory:  Reminder of the basic concepts and calculations useful in chemistry and environmental geochemistry. Storage, preservation and / or preparation of samples for laboratory tests. The use of standard analytical methods for the determination of major and minor components of water - electrochemical measurements, titration methods, VIS spectrophotometry - used in field studies and laboratory. The importance and the method of determination of selected indicators of water pollution. Ways of presenting the results of environmental tests.  Field Classes:  Step by step chart in environmental research. Methods for collecting, storing and preservation of samples of surface water and rainwater. Methods of determining and importance of selected physicochemical parameters of water. | | |
|  | Intended learning outcomes  P\_W01 knows the basic geochemical elements cycle in nature.  P\_W02 knows the mechanisms and dynamic circulation of the elements in nature.  P\_U01 knows how to perform a basic quantitative and qualitative calculation applied in geochemistry.  P\_U02 knows how to prepare samples for analysis and carrying signs selected pollutants appropriate instrumental methods. Knows how to interpret the results.  P\_K01 Student has social skills to enable the smooth functioning of the group and has responsibility for entrusted laboratory equipment. | Symbols of learning outcomes for particular fields of studies, *e.g. K\_W01\**, *K\_U05,K\_K03*  K2\_W03  K2\_W08  K2\_U05  K2\_U01, K2\_U04  K2\_K02 | |
|  | Required and recommended reading *(sources, studies, manuals, etc.)*  Required reading  White W.M., 2000, Geochmistry, John-Hopkins University Press,  Fortescue J.A.C., 1980, Environmental Geochemistry A Holistic Approach, Springer-Verlag New York Inc.  Migaszewski Z., Gałuszka A., 2009. Podstawy geochemii środowiska, WNT  VanLoon G.W., Duffy S.J., 2007; Chemia środowiska, PWN,  Wachowski L., Kirszensztejn P.(red.), 1999, Ćwiczenia z podstaw chemii środowiska, Wydawnictwo Naukowe Uniwersytetu i. Adama Mickiewicza w Poznaniu | | |
|  | Assessment methods for the intended learning outcomes:  Lecture: test. K2\_W03, K2\_W08.  Lab classes: 1-hour computational test K2\_U05, K2\_U01, K2\_U04.  Field classes: written report K2\_K02. | | |
|  | Credit requirements for individual components of the course/module:  Lectures:  - exam - 1-hour test (50% of correct answers required to pass).  Laboratory classes:  - monitoring attendance and progress on the course subject matter,  - 1-hour computational test 50% of correct answers required to pass).  Field classes:  - monitoring attendance and progress on the course subject matter,  - written report from the field classes | | |
|  | Total student effort | | |
| form of student activities | | number of hours for the implementation of activities |
| Hours of instruction (as stipulated in study programme) :  - lecture: 14  - laboratory classes: 14  - field classes: 14 | | 42 |
| student’s own work:  - consultations: 20  - preparation before class (lecture, etc.): 10  - research outcomes: 10  - reading set literature: 10  - writing course report: 10  - preparing for exam: 23 | | 83 |
| Total number of hours | | 125 |
| Number of ECTS credits | | 5 |