Annex No. 5

to Ordinance No. 21/2019

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

|  |  |  |  |
| --- | --- | --- | --- |
|  | Course/module name in Polish and English  Methods of environmental samples collecting/Metody poboru prób środowiskowych | | |
|  | 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, Department of Experimental Petrology | | |
|  | Course/module code  USOS | | |
|  | Type of course/module *(mandatory or optional)*  mandatory | | |
|  | 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*)  I | | |
|  | Semester *(winter or summer)*  winter | | |
|  | Form of classes and number of hours  Lectures: 10  Field classes: 20  Teaching methods  Multimedia lecture, mini-lecture, presentation, practical exercises, individual work, group work, preparation of reports. | | |
|  | Name, title/degree of the teacher/instructor  Coordinator: Dr Adriana Trojanowska-Olichwer  Lecturer: Dr Adriana Trojanowska-Olichwer, Dr hab. Maciej Górka Prof. UWr, Dr Wojciech Drzewicki,  Classes instructor:  Field classes instructor: Dr Adriana Trojanowska-Olichwer, Dr hab. Maciej Górka Prof. UWr, Dr Wojciech Drzewicki, Dr Marta Jakubiak | | |
|  | Course/module prerequisites, in terms of knowledge, skills, social competences  Basic knowledge of geology, meteorology, climatology, atmospheric chemistry, general ecology, hydrology, hydrogeology. | | |
|  | Course objectives  To acquaint students with the methodology of sampling and measurement of environment parameters, provide students with the principles of preparing samples for chemical analysis. | | |
|  | Course content  Lectures:  1. Sampling of solid materials:  - spotted and pasty samples;  - easily fusible samples;  - samples of loose materials and pieces;  - soil samples;  - arable soil samples.  2. Testing of solid mineral deposits:  - preliminary messages, methods of sampling (testing of cores, grist, cuttings, exploratory holes);  - samples for testing (chemical, clastic and clay minerals, mineralogical-petrographic, stratigraphic, physico-mechanical);  - storage of samples of solid minerals and documentation of sampling;  - methods of sampling at outcrops and mining excavations (point, furrow, felling, excavation, wells);  - testing the deposit in mining excavations;  - conditions for correct testing of deposits in mining excavations.  3. Taking gas samples:  - types of gas samples;  - classification of gas sampling and analysis methods;  - manual methods of air sampling (sedimentation, isolation, aspiration);  - sampling of waste gases;  - sampling of aerosols and dusts.  4. Health and safety rules applicable during field tests and measurements  5. Principles of collecting, transporting and storing samples of surface water, suspensions for physical and chemical tests (instruments and vessels for sampling, fixing) as well as debris and plankton for taxonomic investigations (cupcakes, nets, preservation of samples). Measurement of physical and chemical parameters  6. Rules for collecting, transporting and storing groundwater samples for physico-chemical tests (instruments and vessels for taking water samples, fixing); Measurement of physical-chemical parameters "on-line". Cleansing pumping;  7. Downloading rules and devices for collecting rainwater, waters flowing down the trunk and under-crown waters.  8. Preparation of soil samples for laboratory analysis. Downloading rules and instruments for soil sampling:  - for standard laboratory analyzes (from organic level and from mineral level - with intact and intact structure)  - for specialized laboratory analyzes (measurement of water binding strength in soil, micromorphological analyzes)  9. Sampling of bottom sediments and their preparation for laboratory analysis  Field classes:  - Collection of the atmospheric air sample and measurement of the carbon isotope concentration and composition of carbon dioxide and methane on the Picarro G-2201i CRDS spectrometer.  - Discussion and presentation of filter preparation and working principles of the DHA-80 collector for PM2.5 dust collection  - Collection of groundwater from piezometer and wells, measurement of physicochemical parameters of groundwater.  - Surface water withdrawal from watercourses and water reservoirs, measurement of physicochemical and biological parameters, principles of sampling using various samplers, maintenance and principles of sample transport.  - Collection of bottom sediments from water reservoirs, measurement of physicochemical and biological parameters, principles of sampling with different samplers, maintenance and principles of sample transport.  - Collection of soil samples using several types of samplers. Maintenance and principles of sample transport. | | |
|  | Intended learning outcomes  P\_W01 students knows the basic principles of sampling and conducting environmental measurements.  P\_W02 students knows the safety rules in force in the course of fieldwork.  P\_W03 They understands depending on environmental conditioning representativeness of collected samples and conducted measurements.  P\_U01 Students can actually choose the methodology of sampling and the measurements for the planned research.  P\_U02 They can be properly handled samples taken from the environment.  P\_U03 Students can handle basic measurement equipment used in environmental studies.  P\_U04 They can create the correct documentation conducted field research and sampling.  P\_K01 Student ensure the correctness of the methods of sampling.  P\_K02 Student are capable of teamwork, respecting the principle of priority actions.  P\_K03 The ensures the reliability of the research. | Symbols of learning outcomes for particular fields of studies, *e.g. K\_W01\**, *K\_U05,K\_K03*  K2\_W02, K2\_W06, K2\_W08  K2\_W03, K2\_W06, K2\_W08  K2\_W01, K2\_W04, K\_W06  K2\_U01  K2\_U01, K2\_U03  K2\_U01, K2\_U03  K2\_U01, K2\_U03  K2\_K01, K2\_K04  K2\_K02  K2\_K07 | |
|  | Required and recommended reading *(sources, studies, manuals, etc.)*  Required reading  Zhang C., 2007, Fundamentals of Environmental Sampling and Analysis, John Wiley & Sons, p. 456  EPA, 2001, Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual available on: https://clu-in.org/download/contaminantfocus/sediments/methods-for-collection-epa-manual.pdf  Freshwater Biological Sampling Manual available on: https://www.for.gov.bc.ca/hts/risc/pubs/aquatic/freshwaterbio/  Seinfeld J.H., Pandis S.N., 2006, Atmospheric chemistry and physics. From air pollution to climate change, John Wiley & Sons.  Michaelis W., 1997, Air pollution. Dimensions, trends and interactions with forest ecosystem, Springer-Verlag. | | |
|  | Assessment methods for the intended learning outcomes:  Lecture: Written examination. K2\_W02, K2\_W06, K2\_W08, K2\_W03, K2\_W06, K2\_W08, K2\_W01, K2\_W04, K\_W06, K2\_U01.  Field classes: reports from field classes and written test. K2\_W01, K2\_W02, K2\_W03, K2\_W04, K2\_W06, K2\_W08, K2\_U01, K2\_U03, K2\_K01, K2\_K02, K2\_K04, K2\_K07. | | |
|  | Credit requirements for individual components of the course/module:  Lecture:  -1-hour written test (in English): required 60% of correct answers to pass.  Field class:  - monitoring attendance and progress on the course subject matter,  - reports from the field classes,  - 1-hour test from field classes (in English): required 60% of correct answers to pass. | | |
|  | Total student effort | | |
| form of student activities | | number of hours for the implementation of activities |
| classes (according to the plan of studies) with a teacher/instructor:  - lectures: 10  - field classes: 20 | | 30 |
| student's own work (including group-work) such as:  - consultation: 10  - being prepared for classes: 5  - preparing papers/presentations/projects: 10  - writing a class report: 10  - preparing for tests and exam: 10 | | 45 |
| Total number of hours | | 75 |
| Number of ECTS credits | | 3 |