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  Mineralogia stosowana/Applications of mineral sciences | | |
|  | Discipline  Earth and Environmental Sciences | | |
|  | Language of instruction  English | | |
|  | Teaching unit  Faculty of Earth Sciences and Environmental Management, Institute of Geological Sciences, Department of Experimental Petrology, Department of Mineralogy and 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)*  summer | | |
|  | Form of classes and number of hours  Lectures: 14  Lab classes: 24  Multimedia lecture, discussion, practical exercises, individual work, group work, preparation of reports. | | |
|  | Name, title/degree of the teacher/instructor  Coordinator: Dr hab. Jakub Kierczak, Prof. UWr  Lecturer: Dr hab. Jakub Kierczak, Prof. UWr, Dr Wojciech Bartz, Dr Krzysztof Turniak  Classes instructor: Dr hab. Jakub Kierczak, Prof. UWr, Dr Wojciech Bartz, Dr Krzysztof Turniak | | |
|  | Course/module prerequisites, in terms of knowledge, skills, social competences  General knowledge and skills acquired during bachelor degree studies in geology or related fields. | | |
|  | Course objectives  The aim of the course is to draw attention to the links between mineralogical sciences and the industry in the context of planning and control of technological processes aiming at processing of mineral raw materials, taking into account both raw material properties and expected physical and mechanical properties of the product. | | |
|  | Course content  Lectures:  Relationships between mineralogical sciences and other fields and disciplines of science and the industry. Material engineering and related economic, legal aspects (guidelines for national and European standardization bodies) and environmental aspects. Characteristics of materials of anthropogenic origin (slag, fly ash, cement and mortar, building stone, ceramics, metals and alloys, polymers, synthetic and natural glasses, biominerls and biomineralization): basic classification, testing methods and production technology, physical and chemical properties. Aeromineralogy. Mineral composition and origin of atmospheric dusts. Asbestos in environment.  Laboratory classes:  The planning, preparation and interpretation of research results concerning various materials, in order to determine their phase composition, properties, conditions of processing leading to their formation.  Sampling procedures and equipment in aeromineralogy. Analytical methods for determination of particulate contamination. Optical microscope and SEM particle counting. Particle identification. Results calculation, presentation and interpretation to show sources of air pollution. | | |
|  | Intended learning outcomes  P\_W01 Student knows the methods for assessment of natural resource parameters and possibilities of its processing for the industry.  P\_W02 Student has knowledge about the application of legal acts and standard procedures related to the assessment of the quality and suitability of raw materials for industry.  P\_W03 Student knows the processes occurring at the contact of building materials and/or industrial waste with the surrounding environment.  P\_U01 Student has the ability to plan and carry out studies of natural resources and anthropogenic substances, including applications of modern methods used in mineralogical sciences.  P\_U02 Student can independently search and use scientific literature in English.  P\_K01 Student knows the effects and impacts of industrial activity (mining, mineral processing) on the environment.  P\_K02 Student understands the relationship between different disciplines of science and economic development. | Symbols of learning outcomes for particular fields of studies, *e.g. K\_W01\**, *K\_U05,K\_K03*  K2\_W03, K2\_W06, K2\_07  K2\_W08, K2\_W10  K2\_W01, K2\_W03  K2\_U03, K2\_U04  K2\_U02, K2\_U06  K2\_K04, K2\_K05  K2\_K06 | |
|  | Required and recommended reading *(sources, studies, manuals, etc.)*  Required reading  Vaughan D.J. and Wogelius R.A. Eds., 2013, Environmental Mineralogy II. Mineralogical Society, 489 pp.  Recommended reading  Chung D. L., Composite Materials. Science and Applications. Springer-Verlag London Limited, 2010.  Mukherjee S., Applied Mineralogy. Applications in Industry and Environment. Dordrecht; New York : New Delhi, India, Springer 2011. | | |
|  | Assessment methods for the intended learning outcomes:  Lecture: written examination. K2\_W01, K2\_W03, K2\_W06, K2\_W07, K2\_W08, K2\_W10, K2\_K04, K2\_K05, K2\_K06.  Classes: writing a class report (individual or group). K2\_U02, K2\_U03, K2\_U04, K2\_U06. | | |
|  | Credit requirements for individual components of the course/module:  Lectures:  - exam (written) a positive result after 50% of the points.  Lab classes:  - monitoring attendance (two possible absences) during classes,  - writing a set of class reports describing tasks given on classes, (students should elaborate all reports on the tasks carried out during classes),  - the opportunity to do classes during individual consultations with lecturers.  The final grade is the result of the exam grade (50%) and the laboratory grade (50%). | | |
|  | 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: 14  - lab classes: 24  - consultation: 12 | | 50 |
| student's own work (including group-work):  - reading the suggested literature: 5  - preparing papers/presentations/projects: 15  - writing a class report: 15  - preparing for tests and exam: 15 | | 50 |
| Total number of hours | | 100 |
| Number of ECTS credits | | 4 |