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  Hydrogeological mapping (field course)/Kartowanie hydrogeologiczne (ćwiczenia terenowe) | | |
|  | Discipline  Earth and Environmental Sciences | | |
|  | Language of instruction  English | | |
|  | Teaching unit  Faculty of Earth Science and Environmental Management, Institute of Geological Sciences, Department of Applied Hydrogeology, Department of Basic Hydrogeology | | |
|  | 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*)  I | | |
|  | Semester *(winter or summer)*  summer | | |
|  | Form of classes and number of hours  Field classes: 36  Teaching methods  practical exercises, individual work, group work, preparation of reports, | | |
|  | Name, title/degree of the teacher/instructor  Coordinator: Dr hab. Henryk Marszałek, Prof. UWr,  Field classes instructor: Dr hab. Henryk Marszałek, Prof. UWr, Dr hab. Sebastian Buczyński | | |
|  | Course/module prerequisites, in terms of knowledge, skills, social competences  The knowledge and skills in the field of surface and groundwater flow forming and characteristics of soils. | | |
|  | Course objectives  Getting to know field measurements methods in the range of hydrogeological mapping. Students possess the ability to make measurements of river flow rate, depth of groundwater table, springs discharge, physical and chemical parameters of water, the ability of soils infiltration and sampling. | | |
|  | Course content  1. Measurement of river discharge using water flow meter or float and volumetric methods.  2. Methodology of springs and wells research during the hydrogeological mapping.  3. Field measurements of physical and chemical water parameters.  4. Sampling of water and soil for the laboratory tests.  5. Field measurements of infiltration, permeability and fissuring of rocks.  6. Elaboration of the database and maps from field measurements. | | |
|  | Learning outcomes  P\_W01 Student knows the terminology in hydrogeological mapping.  P\_W02 Student knows the research methodology used in hydrogeological mapping.  P\_W03 Student knows the rules of planning and range of field measurements necessary for the implementation of hydrogeological studies.  P\_U01 Student is able to plan and can make hydrogeological measurements.  P\_U02 Student can water and soil sampling.  P\_U03 Student can independently perform database and hydrogeological maps.  P\_K01 Student can realize the program of groundwater management and he is aware of the need for prudent management of natural resources.  P\_K02 Student points toward to continuously expand knowledge and work skills.  P\_K03 Student appreciates the role of communication in the work team. | Symbols of learning outcomes for particular fields of studies, *e.g. K\_W01\**, *K\_U05,K\_K03*  K2\_W01, K2\_W02, K2\_W03, K2\_W09  K2\_W02, K2\_W06, K2\_W08  K2\_W01, K2\_W06  K2\_U01, K2\_U04  K2\_U01, K2\_U04  K2\_U05, K2\_U06, K2\_U07  K2\_K03  K2\_K01  K2\_K02 | |
|  | Required and recommended reading *(sources, studies, manuals, etc.)*  Required reading  Domenico P.A. & Schwartz F.W., 1990. Physical and chemical hydrogeology. John Wiley & Sons. New York.  Downing R.A. & Wilkinson W.B., 1991. Applied groundwater hydrology. Clarendon Press, Oxford.  Freeze R.A., Cherry J.A., 1979. Groundwater. Prentice Hall Inc.  Fetter C, W. 2013. Applied hydrogeology, Pearson Education.  Gilli E., Mangan Ch., Mudry J., 2013. Hydrogeology - Objectives, Methods, Applications, CRC Press, Taylor and Francis Group, Boca Raton: 367.  Heath R. C., 1987. Basic Ground-Water Hydrology. USGS, Denver.  Recommended reading  Appelo C.A.J., Postma D.,2007. Geochemistry, groundwater and pollution. Balkema Publisher, Leiden.  Gilli E., Mangan Ch., Mudry J., 2013. Hydrogeology - Objectives, Methods, Applications, CRC Press, Taylor and Francis Group, Boca Raton: 367.  Heath R. C., 1987. Basic Ground-Water Hydrology. USGS, Denver. | | |
|  | Assessment methods for the intended learning outcomes:  Participation in the field course. Completion of a Project. K2\_W01, K2\_W02, K2\_W03, K2\_W06, K2\_W08, K2\_W09, K2\_U01, K2\_U04, K2\_U05, K2\_U06, K2\_U07, K2\_K01, K2\_K02, K2\_K03. | | |
|  | Credit requirements for individual components of the course/module:  - monitoring attendance and progress on the course subject matter,  - writing a class report (realization of measurements, database and maps). | | |
|  | 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:  - field classes: 36  - consultations: 4 | | 40 |
| student's own work (including group-work) such as:  - being prepared for classes: 5  - reading the suggested literature: 5  - writing a class report: 10  - preparing for tests and exam: 15 | | 35 |
| Total number of hours | | 75 |
| Number of ECTS credits | | 3 |