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  Groundwater exploitation/Eksploatacja wód podziemnych | | |
|  | Discipline  Earth and Environmental Science | | |
|  | Language of instruction  English | | |
|  | Teaching unit  Faculty of Earth Science and Environmental Management, Institute of Geological Sciences, Department of General 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  Lectures: 14  Classes: 24  Teaching methods  Multimedia lecture, individual work, preparation of reports. | | |
|  | Name, title/degree of the teacher/instructor  Coordinator: Dr Tomasz Olichwer  Lecturer: Dr Tomasz Olichwer  Classes instructor: Dr Tomasz Olichwer | | |
|  | Course/module prerequisites, in terms of knowledge, skills, social competences  The knowledge and skills in the field of groundwater dynamics | | |
|  | Course objectives  The objectives of the subject is to acquaint the student with the theoretical informations of the construction and exploitations of groundwater water intakes, and present the formal-legal regulations in water requirement. | | |
|  | Course content  Lectures:  1. Classification of water intakes, history, terminology.  2. The hydrogeological reasons to choose the type of intake.  3. Characteristics, construction and exploitation of dug wells, drilled wells, infiltration intakes, drainage intakes, radial intakes and spring waters intakes.  4. The methods of drawing groundwater from the well, the types and location of pumps, the use of siphons.  5. The problems of exploitation wells, the well ageing, methods of restoration and recovery wells.  Classes:  1. The concept of the construction of intake.  2. The implementation of the project of geological investigations.  3. The implementation of hydrogeological documentation.  4. The implementation of legal documentation justifying the right to water exploitation. | | |
|  | Learning outcomes  P\_W01 Student knows the terminology in design and construction of groundwater intakes.  P\_W02 Student knows the technology of geological drillings and methods of intakes construction.  P\_W03 Student knows formal-legal regulations in water requirement. Student has knowledge of water treatment station and water supply system construction.  P\_U01 Student can carried out project of geological investigations.  P\_U02 Student can carried out the hydrogeological documentation and legal documentation justifying the right to water exploitation in order to obtain a permit for groundwater extraction.  P\_U03 Student can develop the concept of groundwater intake.  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.  P\_K04 Student has the ability to to evaluate information sources provided by other authors. | Symbols of learning outcomes for particular fields of studies, *e.g. K\_W01\**, *K\_U05,K\_K03*  K2\_W02, K2\_W03, K2\_W09  K2\_W02, K2\_W08  K2\_W06, K2\_W10  K2\_U01, K2\_U04, K2\_U06  K2\_U01, K2\_U04, K2\_U06  K2\_U05, K2\_U06, K2\_U07  K2\_K03  K2\_K01  K2\_K02  K2\_K06 | |
|  | Required and recommended reading *(sources, studies, manuals, etc.)*  Required reading  Jacques E., 1999: The Handbook of groundwater enginering.  Fetter C.W., 1994: Applied hydrogeology. MCPC, New York.  Recommended reading  Brikké F., Bredero M., 2003: Linking technology choice with operation and maintenance. Geneva: World Health Organization | | |
|  | Assessment methods for the intended learning outcomes:  Semester paper (individual). K2\_W02, K2\_W03, K2\_W09, K2\_W08, K2\_W06, K2\_W10  Preparation and implementation of a project (individual). K2\_U01, K2\_U04, K2\_U05, K2\_U06, K2\_U07, K2\_K03, K2\_K01, K2\_K02, K2\_K06. | | |
|  | Credit requirements for individual components of the course/module:  Lecture:  -written test, a positive result - obtaining at least 51% of points.  Classes:  -participation in the classes is mandatory,  - realization of 3 projects assessed positively. | | |
|  | 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  - classes: 24  - consultations: 12 | | 50 |
| student's own work (including group-work) such as:  - being prepared for classes: 10  - reading the suggested literature: 10  - writing a class report: 15  - preparing for tests and exam: 15 | | 50 |
| Total number of hours | | 100 |
| Number of ECTS credits | | 4 |