



Subject card

Subject name and code	Groundwater Resources and Intakes, PG_00042496						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geotechnics, Geology and Marine Civil Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Beata Jaworska-Szulc				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	10.0	0.0	0.0	0.0	25
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	25		4.0		50.0	79
Subject objectives	Student attains basic knowledge about groundwater resources, classification of resources, calculation methods. Quantitative and qualitative threats, protection of groundwater. Overview of groundwater resources in Poland - the main usable aquifers. Project of a small groundwater intake, determination of the profile at the place of the proposed intake, technical design of the well, selection of filter, pumps and drilling methods. A visit at one of groundwater intake in the Tri-City area.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U12] can design: developed water and sewage system, complex heat source, pool water treatment technology, mechanical ventilation installation or underground water intake, drainage of urban water catchment, reservoir control system during flood seizure or water treatment technology, domestic waste water treatment plant	Project of a small groundwater intake, determination of the profile at the place of the proposed intake, technical design of the well, selection of filter, pumps and drilling methods.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	[K7_W09] has deepened, ordered, theoretically developed knowledge related to: hydrology, drainage, water management, flood protection or resource and water intake or water and sewage management	Student attains basic knowledge about groundwater intakes in the Tri-City area. Student analyzes the methods of exploitation and treatment of groundwater. In the groundwater intake project student proposes technical design of the well, selection of filter, pumps and drilling methods.	[SW1] Assessment of factual knowledge
	[K7_U04] is able to prepare and present a presentation on the implementation of a design or research task and to conduct a discussion on the presentation	Student prepare and present the project of a small groundwater intake.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[K7_W11] has knowledge to analyze, evaluate and optimize processes, objects and systems of environmental engineering and knows the principles of rational energy management and resources	Student attains basic knowledge about groundwater resources estimation. Student estimate safe yield on the designed groundwater intake.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K7_U14] can technically and economically analyze and evaluate the solutions and functioning of facilities and systems in the sanitary engineering or flood protection, water intakes and water infrastructure or water and wastewater treatment plants; can assess the suitability and potential of using new achievements in materials, fixtures, devices and methodologies for designing and modeling the analyzed technical infrastructure and industrial objects, including innovative solutions	Student attains basic knowledge about groundwater intakes in the Tri-City area. Student analyzes the methods of exploitation and treatment of groundwater. In the groundwater intake project student proposes technical design of the well, selection of filter, pumps and drilling methods.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment	
Subject contents	Groundwater resources in Poland - main usable aquifers. Groundwater resource classification: disposable, perspective and renewable resources, safe yield on the intakes. Methods for determining renewable resources. Quantitative and qualitative water threats. Pollution and protection of groundwater. Types of groundwater intakes. Project of a small groundwater intake, determination of the profile at the place of the proposed intake, technical design of the well, selection of filter, pumps and drilling methods. Groundwater intakes in the Tri-City area.		
Prerequisites and co-requisites	basics of hydrogeology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	presentation of the project	60.0%	50.0%
	test - 10 questions	60.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Błaszyk., Byczyński H. :Wody podziemne, zagrożenie i ochrona. Warszawa:Instytut Kształtowania Środowiska 1986. 2. Dąbrowski S.,Górski.J.,Kapuściński J.,Przybytek J.,Szczepański A.:Metodyka określania zasobów eksploatacyjnych ujęć zwykłych wód podziemnych. Warszawa: Ministerstwo Środowiska 2004. 3. Gabryszewski, Wieczysty A.: Ujęcia wód podziemnych. Warszawa: Arkady 1985. 4. Kleczkowski A.S.(red.): Ochrona wód podziemnych. Warszawa: Wydawnictwa Geologiczne 1984. 5. Pazdro Z., Kozerski B.: Hydrogeologia ogólna. Warszawa: Wydawnictwa Geologiczne 1990. 6. Atlas zasobów geotermalnych na Niżu Polskim, red. Górecki, Kraków 2006 	

	Supplementary literature	7. Ciężkowski W.(red.):Butelkowane wody mineralne Polski.Wrocław 1993. 8. Gonet A., Macuda J.: Wiertnictwo hydrogeologiczne. Kraków:Wydawnictwa AGH 1995. 9. Pleczyński J.: Odnawialność zasobów wód podziemnych. Warszawa: Wydawnictwa Geologiczne 1981.
	eResources addresses	
Example issues/ example questions/ tasks being completed	What aquifers (meaning stratigraphy) are used in Poland? What are disposable, perspective and renewable resources, what is safe yield? How to choose a well filter for specific hydrogeological conditions?	
Work placement	Not applicable	