



## Subject card

Subject name and code	, PG_00059052						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Małgorzata Pruszkowska-Caceres				
	Teachers		dr inż. Marzena Wójcik				
			dr hab. Małgorzata Pruszkowska-Caceres				
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		6.0		70.0	101
Subject objectives	To familiarize student with the mechanisms of formation and movement of groundwater, with the possibilities of groundwater exploitation and with potential risks of contamination.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W12		Student is familiar with mechanisms of groundwater formation and movement		[SW1] Assessment of factual knowledge		
	[K6_U04] can recognize basic rocks and minerals, can create and read maps and geological and hydrogeological sections; can read and interpret geological documentation		Student is able to create and analyze hydrogeological maps and cross-sections		[SU1] Assessment of task fulfilment		
	[K6_W04] possesses elementary knowledge in the field of land mechanics, ground science, land reclamation and geotechnics; has basic knowledge about the composition of air, water and soil, environmental pollution and processes responsible for their formation and ways to reduce them, knows the principles and organization of sustainable water management		Student is able to obtain information from hydrogeological gross-sections and maps and to interpret well pumping tests.		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K6_W06] has a structured and theoretically founded knowledge in the field of computer science, numerical methods and the possibilities of their applications for solving tasks, description of phenomena related to the flow of water in the environment, in open pipes and channels, filtration, migration of pollutants		Student is familiar with basic computational method and tools for solution of groundwater flow problems. Student is familiar with basic mechanisms of groundwater contamination and with basic principles of assessing groundwater resources.		[SW1] Assessment of factual knowledge		

Subject contents	Lecture Groundwater in hydrogeological cycle. Groundwater occurrence, origin and age. Hydrogeological properties of soils and rocks. Groundwater flow. Groundwater chemistry. Groundwater contamination. Measurements and monitoring in groundwater. Management of groundwater resources. TUTORIALS Investigation of hydrogeological conditions on the basis of drilling results. Estimation of hydrogeological parameters based on soil granulometric curve. Interpretation of the results of steady state test pumpings. Interpretation of chemical groundwater analyses. Analysis of hydrogeological maps. Dewatering of an excavation. Evaluation test.		
Prerequisites and co-requisites	knowledge of mathematics, basic hydrology and geology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Evaluation test for tutorials	60.0%	25.0%
	Average note for projects	60.0%	25.0%
	Evaluation test for lectures	60.0%	50.0%
Recommended reading	Basic literature	- Pazdro Z., Kozerski B. Hydrogeologia ogólna Wyd. Geol. Warszawa 1990 - Wieczysty A., Hydrogeologia Inżynierska, PWN, Warszawa 1982 - Macioszczyk A., Dobrzyński D., Hydrogeochemia, PWN, Warszawa 2002	
	Supplementary literature	- Domenico P.A., Schwartz F.W., Physical and chemical hydrogeology, Wiley, 1998 - Chelmiński W., Woda Zasoby, degradacja, ochrona, PWN Warszawa 2002.	
	eResources addresses	Adresy na platformie eNauczanie: Hydrogeologia - Moodle ID: 36276 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36276">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36276</a>	
Example issues/ example questions/ tasks being completed	- List the factors influencing the intensity of groundwater recharge by infiltration - Give examples of sources of groundwater contamination - Draw a hydrogeological cross-section based on drilling data - Describe hydrogeological conditions for a given site, based on hydrogeological map		
Work placement	Not applicable		

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