University of Gdańsk

Subject card

Subject name and code	Underground waters protection - lecture, PG_00193005		
Field of study	Geology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	2.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Hydrology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Izabela Chlost	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	0.0	0.0	0.0	20
	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	20	1.0	29.0	50

Subject objectives	Gain knowledge of the conditions for the formation of groundwater communities and the underground water cycle, as well as potential sources of pollution and ways to protect these waters.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GEOLL3_U02] has the skill of analytical and synthetic way of reasoning leading to correct inference based on the results obtained or the facts presented	Is able to identify natural and anthropogenic threats to groundwater and indicate methods of their protection. Is able to determine the status of resources and quality, the method of using groundwater, including in relation to applicable legal standards.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
[GEOLL3_W02] knows and understands the terminology appropriate in science and natural sciences	Knows and uses professional terminology in the field of water circulation conditions in nature, with particular emphasis on resources, quality, threats and protection of groundwater.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[GEOLL3_W07] knows the anthropogenic transformation of the natural environment, including the effects of the exploitation of mineral resources	Knows and understands the importance of groundwater for the natural environment, humans and the economy and is aware of the need to protect it due to the effects of their excessive exploitation.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[GEOLL3_U06] is able to identify geological objects and combine them with geological processes and anthropogenic environmental transformations	Has the skills to identify the geological environment and characterize its influence on the circulation and quality of groundwater, including changes and pressures caused by human activities.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written
[GEOLL3_U01] is able to apply basic measurement and analytical techniques in the field and in the laboratory, plans to conduct research and measurements	Knows and is able to use methods for measuring changes in groundwater levels, as well as to determine organoleptic and physico-chemical indicators of water quality indicating their contamination.	[SU1] oral statement/conversation/ discussion [SU4] test/exam - oral or written

Subject contents

- Legal basis for groundwater protection, taking into account the Water Framework Directive, Water Law, Geological and Mining Law and others that affect the development of groundwater resources and quality.
- Potential anthropogenic and geogenic threats to groundwater resources and quality.
- Groundwater pollution foci, taking into account their spatial distribution (point, strip, scattered, large-area).
- Classification of factors and conditions of groundwater quality degradation.
- Groundwater protection zones.
- Types and methods of groundwater protection, divided into technical and non-technical methods.
- Main Groundwater Reservoirs (GZWP); GZWP protection areas as a basic element of groundwater protection on a regional scale.
- Importance and protection of wetlands.
- Organization of the groundwater monitoring network in Poland.
- Management, threats and protection of groundwater in the Tri-City area and in the coastal zone.

Prerequisites and co-requisites

Basics of general hydrogeology. Understanding the cause-and-effect stages of the water cycle in nature.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Problem questions, participation in discussion	51.0%	40.0%
Colloquium/Test with open and closed questions	51.0%	60.0%

Recommended reading	Basic literature	• Chełmicki W., 2002, Water. Resources, degradation, protection. PWN Scientific Publishing House, Warsaw. • Górski, J. 2022, Groundwater protection in Poland. UAM Scientific Publishing House, Poznań. • Kleczkowski S. (ed.), 1984, Groundwater protection. Geological Publishing House, Warsaw. • Kleczkowski S., 1994, Methodological basis of groundwater protection, AGH, Kraków. • Lidzbarski M. (ed.), 2022, Groundwater intake protection zones - risk analysis and design. Methodological guide. Part 1.: Risk analysis for establishing groundwater intake protection zones. PIG-PIB, Warsaw. • Macioszczyk A., Dobrzyński D., 2007, Hydrogeochemistry of the groundwater active exchange zone. PWN Scientific Publishing House, Warsaw. • Makles M., Pawlaczyk P., Stańsko R., 2014, Best practices guide of wetland protection. Environmental Projects Coordination Center. www.cpks.lasy.gov.pl • Paczyński B., Sadurski A., (eds.), 2007, Regional hydrogeology of Poland, PIG, Warsaw.
	Supplementary literature	• Herbich P. et al. (eds.), 2008, Methodology for designating protected areas of the Main Groundwater Reservoirs for the purposes of planning and managing water in river basins. PIG, Warsaw. • Kordalski Z., 2019, Optimal groundwater management in the coastal zone. PIG, PSH Forum. • Kozerwski B. (ed.) 2007, Gdańsk Water-bearing System. Gdańsk University of Technology Publishing House, Gdańsk. • Lidzbarski M., 2016, Integrated groundwater monitoring system in Gdańsk and Sopot, Przegląd Geologiczny, vol. 64, no. 6, pp. 375-381. • Pleczyński J., 1981. Renewability of groundwater resources, Ed. Geological, Warsaw.
	eResources addresses	
Example issues/ example questions/ tasks being completed	• List and describe shortly technical forms of groundwater protection. • Discuss the threats to groundwater associated with mining of coal and other minerals. • Give regulations governing the protection of thermal and spa waters. • Determine the importance of wetlands for groundwater protection. • What does the abbreviation GZWP stand for, what are the criteria for their separation and basic forms of protection. • Is groundwater monitoring necessary? Justify your answer.	
Work placement	Not applicable	

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