University of Gdańsk

Subject card

Subject name and code	Surface and Groundwater Protection - lecture, PG_00201427		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2027	Academic year of realisation of subject	2028/2029
Education level	Bachelor's studies	Subject group	Obligatory subject group in the field of study Subject group related to practical vocational preparation
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	practical	Assessment form	exam
Conducting unit	Department of Hydrology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Joanna Fac-Beneda, prof. UG	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	0.0	30

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	30	1.0	19.0	50

Subject objectives

- Assessment of the magnitude, distribution of surface and groundwater threats and their resources
- Diagnosis of surface and groundwater threats and their resources;
- Analysis of the quality of water resources;
- Planning and forecasting of surface and groundwater hazards and their resources

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[GWOZWL3-W02] the importance of advanced knowledge in the sciences allowing to understand the processes and phenomena occurring in the hydrosphere, as well as knowledge of the social sciences and of the Earth's geographic environment - as a system of interrelated and interacting components.	knows and understands the importance of scientific knowledge for understanding processes and phenomena in the hydrosphere and knowledge of water relations in a changing geographical environment	[SW4] test/exam - oral or written
	[GWOZWL3-W03] the organisation and legal framework of environmental protection, nature conservation and water management, as well as the principles governing the organisation and operation of hydrological and meteorological services and the fundamentals of Integrated Environmental Monitoring.	is familiar with the organisation and legal basis of surface water and groundwater protection, as well as with the organisation and functioning of hydrological and meteorological services and the basics of Integrated Environmental Monitoring	[SW4] test/exam - oral or written
	[GWOZWL3-W09] potential threats and sources of pollution of surface and groundwater resulting from the development of civilization, in particular strong anthropopression.	knows the potential threats and sources of surface and groundwater pollution resulting from strong anthropopression	[SW4] test/exam - oral or written
	[GWOZWL3-K06] an informed and reliable assessment of the impact of humans on the aquatic environment.	is prepared to make an informed and honest assessment of the impact of human activities on the aquatic environment	[SK2] presentation/project/paper/ report
	[GWOZWL3-K05] take responsibility for the safety of his own work and that of others, dealing with emergencies, exercising caution in the laboratory and in the field, responsibility for entrusted equipment and apparatus.	is willing to take responsibility for the safety of his own work and that of others, to deal with emergencies, to take care in the laboratory and in the field, to be responsible for the equipment and apparatus entrusted to him	[SK8] observation of student's independent or team work
	[GWOZWL3-K03] systematic further education and professional development, updating and expand his knowledge and skills, understands the limitations of his own knowledge in the context of civilization progress and recognizes authorities in the professional and scientific environment.	is willing to undergo systematic retraining and professional development, to update and expand his/her knowledge and skills, understands the limits of his/ her own knowledge in the context of the progress of civilisation and recognises authority in the professional and scientific community	[SK8] observation of student's independent or team work
	[GWOZWL3-U07] use literature and other available sources of information, including information technology, multimedia, Internet, databases, and select and critically evaluate information.	be able to use literature, reference materials and databases, as well as information technology and multimedia, and to select and critically evaluate hydrological information	[SU5] implementation of a problem task
	[GWOZWL3-U06] assess the impact of planned investments on value and quality of water resources and propose options for solutions to protect and restore water resources, recognize their weaknesses and strengths as well as opportunities and threats.	is able to assess the impact of human activity on the quality of water resources and to propose options for solutions to protect and restore water resources	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
	[GWOZWL3-U03] observe and describe the changes taking place in water management and predict further directions of its development as well as conduct a critical analysis of case studies of problems of water management and protection of water resources in terms of impact on ecological, social and economic systems; natural valorization and assessment of quality of the environment.	is able to observe and describe changes in the aquatic environment and carry out a critical analysis of water conservation problems	[SU1] oral statement/conversation/ discussion

Course outcome	Subject outcome	Method of verification
[GWOZWL3-U04] distinguish between objectives, analyze and evaluate modern strategies for managing environment especially in the context of ecosystem approach to managing human activities in the environment with taking into account relevant law regulations and the indication of administrative bodies responsible for the management of waters and the protection of water resources.	is able to distinguish between the objectives, analysis and evaluation of modern water resources management strategies, taking into account the relevant legislation and the indication of the administrative bodies responsible for water resources protection	[SU1] oral statement/conversation/ discussion
[GWOZWL3-W05] assumptions of the ecosystem approach to management of the environment and human activities in the environment as well as the development directions in the field of applied solutions and scientific research for the protection and restoration of water resources in selected divisions of the national economy.	knows and understands the assumptions of the ecosystem approach to water resources management as well as the developments in applied solutions and research for the protection of surface and groundwater	[SW4] test/exam - oral or written
[GWOZWL3-W06] issues relating to hydraulic engineering and water treatment and wastewater treatment processes.	knows and understands wastewater treatment processes	[SW4] test/exam - oral or written

Subject contents

1. Chemical composition of surface and groundwater and their pollution.
2. Outbreaks of pollution: point, area, linear.
3. Water degradation, self-purification, purification.
4. Monitoring of surface and groundwater quality.
5. Systems and methods of assessing surface and groundwater quality.
6. Classification of factors and conditions of groundwater quality degradation.
7. Types and methods of groundwater protection.
8. Basic hydrotechnical facilities and their impact on the water environment.
9. Elements of water law. The Water Framework Directive and the directions of water policy in the European Union.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written/oral exam	51.0%	100.0%

<table>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>• Chelmicki W., 2002, Water. Zasoby, degradacja, ochrona. Wyd. Nauk PWN, Warszawa
• Kleczkowski, A. S., (ed.), 1984, Ochrona wód podziemnych, Wyd. Geol., Warszawa
• Macioszyk A., 1987, Hydrogeochemistry, Wyd. Geologiczne, Warszawa
• Macioszczyk A., Dobrzyński, 2003. Hydrogeochemia wód podziemnych strefy aktywnej wymiany, Wyd. Naukowe PWN, Warszawa
• Pazdro Z., Kozerski B., 1989. General Hydrogeology, Wyd. Geologiczne, Warszawa
• Mikulski Z., 1998, Gospodarka wodna. Wyd. Nauk. PWN, Warszawa
• Towards efficient use of water resources in Europe, EEA Report No 1/2012, Copenhagen, http://www.eea.europa.eu.
• Environment of Europe 2010 - State and Outlook. Synthesis, EEA, Copenhagen, http://www.eea.europa.eu
• Allen J. D., 1998, Ecology of flowing waters, Wyd. Nauk. PWN, Warsaw.
• Ciepielowski A., 1999, Podstawy gospodarowania wodą. Wyd. SGGW, Warszawa.
• Dojlido J., 1995, Chemistry of surface waters, Wyd. Ekonomia i Środowisko, Warsaw.
• Kajak Z., 1998, Hydrobiology-Limnology, Wyd. Nauk. PWN, Warsaw.
• Lwowicz M. I., 1979, Water resources of the world, PWN, Warsaw.
• Macioszczyk, 1987, Hydrogeochemistry, Wyd. Geol., Warsaw.</td></tr>
<tr><td>Supplementary literature</td><td>• Kajak Z., 1979, Eutrophication of waters, PWN, Warsaw.
• Lambor J., 1971, Hydrologia inżynierska, Arkady, Warsaw.
• Tomiałojć L., Drabiński A. (ed), 2005, Środowiskowe aspekty gospodarki wodnej, KOP PAN, Wrocław.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Discuss the operation of a comprehensive wastewater treatment plant.
2. Discuss the problem of drought.
3. Discuss the problem of flash floods.
4. What is self-purification of water?
5. What is virtual water and water footprint?</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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