University of Gdańsk

Subject card

Subject name and code	Waters Chemistry - lecture, PG_00201404		
Field of study	Water Management and Protection of Water Resources		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	1	Language of instruction	Polish
Semester of study	1	ECTS credits	2.0
Learning profile	practical	Assessment form	exam
Conducting unit	Laboratory of Marine Environmental Protection -> Department of Chemical Oceanography and Marine Geology -> Faculty of Oceanography and Geography -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Dorota Burska	
	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

To impart basic concepts and terms of water chemistry. To impart the ability to classify water based on chemical indicators of water quality.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GWOZWL3-W01] The student knows and understands in advanced basic biological, physical and chemical processes and phenomena, as well as analyzes their mutual relations and course in relation to natural environment and socio-ecological systems.	knows and understands basic chemical processes and phenomena in the the aquatic environment	[SW4] test/exam - oral or written
[GWOZWL3-U12] The student can formulate opinions on a selected topic and prepare small studies in foreign language.	The student is able to formulate opinions on a selected topic and prepare small studies in English.	[SU1] oral statement/conversation/ discussion

Subject contents	1. basic analytical concepts in hydrochemistry. Units of measurement used, precision, accuracy;2. Modern model of atomic structure. Basic compounds: oxides, hydrides, acids, hydroxides, salts. Regularities recorded in the periodic table. 3 Interrelationships between the type of chemical bond and the properties of substances;4. Dispersive systems, mixtures, solutions, colloids;5. Equilibria in electrolyte solutions (properties of acids, bases and electrolyte solutions; discussion and interpretation of the pH scale);6. Hydrogen and oxygen and water - its structure and physical properties;7.Methods of sampling and testing chemical composition of water samples, sampling programmes;8.Physical and chemical properties of waters - physical and chemical indicators of water quality, ion balance;9.Ways of representing chemical composition of waters and hydrochemical classifications of waters;10.Inorganic and organic substances in natural waters and their transformations;11. Migration of elements and compounds in natural waters, ionic equilibrium;12. Biogeochemical cycles of biogenic elements (carbon, nitrogen, phosphorus and silicon) and selected metals e.g. Ca, Fe, Hg;13. Influence of selected factors (oxygen conditions, acidification, eutrophication) on element cycles;14. Organic matter chemical composition, importance of assimilation and destruction processes in seasonal and diurnal cycles;15. Carbonate balance, pH and alkalinity of natural waters.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium (test and open questions)	51.0%	100.0%

Recommended reading	Basic literature	1. Dojlido J., 1995. Chemistry of surface water, Ed. Economics and Environment, Białystok, 342, (in Polish); 2. Korzeniewski K., 1986. Hydrochemistry, WSP Słupsk, 225, (in Polish); 3. Macioszczyk A., 1987. Hydrogeochemistry, Ed. Geol., Warszawa, 475, (in Polish);
	Supplementary literature	1. Bielański A. General and inorganic chemistry, PWN, Warszawa, (in Polish); 2. Kajak Z., 1998. Hydrobiology Limnology, PWN, Warszawa, 336, (in Polish); 3. Namieśnik J., Łukasiak J., Jamrógiewicz Z., 1995. Collection of environmental samples for analysis, PWN, Warszawa, 280, (in Polish); 4. Pazdro Z., Kozerski B., 1990. Hydrogeology, Ed.. Geol., Warszawa, 624, (in Polish).
	eResources addresses	
Example issues/ example questions/ tasks being completed	1 Explain what the periodicity of the physical and chemical properties of the elements in the periodic table is due to;2. explain the term strong electrolyte, weak electrolyte, give examples of strong acids, strong bases; 3. define when we talk about covalent bond, covalent-polarised bond, ionic bond;4. give examples of compounds in which such bonds occur;5. give the main factors that shape the composition of surface water; 6. list selected indicators of water quality;7. give the main effects of eutrophication in water bodies;8. How is the total mineralisation of water determined;9. Compare the processes of nitrification and denitrification, give the substrates and products;10. Define carbonate equilibrium in natural waters.11. hazardous substances - define and give examples (e.g.:metals, persistent organic compounds)	
Work placement	Not applicable	

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