University of Gdańsk

Subject card

Subject name and code	Hydrochemistry - lecture, PG_00201223		
Field of study	Aquaculture – Business And Technology		
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	3.0
Learning profile	practical	Assessment form	exam
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Aleksandra Brodecka-Goluch	
	Teachers	dr Aleksandra Brodecka-Goluch dr hab. inż. Marta Staniszewska, prof. UG	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	45.0	0.0	0.0	0.0	0.0	45

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	45	2.0	28.0	75

Subject objectives

Presenting basic concepts and terms in the field of hydrochemistry. Providing the ability to classify water based on chemical indicators of water quality.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[AKWAL3_W02] has an advanced understanding of chemical, biological, physical processes and phenomena, identifies them, analyses their mechanisms in relation to the aquatic environment, and is aware of the connections between various natural disciplines	knows and understands chemical processes and phenomena, identifies and analyzes them in hydrochemistry.	[SW4] test/exam - oral or written

Subject contents	A.1. Basic analytical concepts in hydrochemistry. Units of measurement used, precision, accuracy; A.2. A modern model of the structure of the atom. Basic compounds: oxides, hydrides, acids, hydroxides, salts. Regularities recorded in the periodic table. A.3. Correlation between the type of chemical bond and the properties of the substance; A4. Dispersion systems, mixtures, solutions, colloids; A.5. Equilibrium in electrolyte solutions (properties of acids, bases and electrolyte solutions; discussion and interpretation of the pH scale); A.6. Hydrogen and oxygen and water - its structure and physical properties; A.7. Methods of collecting and testing the chemical composition of water samples, collection programs; A.8. Physical and chemical properties of water - water in aquaculture; A.9. Methods of presenting the chemical composition of water and hydrochemical classifications of water; A.10. Inorganic and organic substances in natural waters and their transformations. A.11. Biogeochemical cycles of carbon, nitrogen, phosphorus, silicon and selected metals, e.g. Fe (forms of occurrence and processes occurring in the atmosphere, biosphere, sea water and sediments; influence of oxygen conditions on the course of cycles; changes in the circulation of elements caused by human activity); A.12. Carbonate balance, alkalinity and pH.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
written test	51.0%	100.0%

Recommended reading

Basic literature	Dojlido J., 1995. Chemistry of surface waters, Ed. Economy and Environment, Białystok, 342. Macioszczyk A., 1987. Hydrogeochemistry, Ed. Geol., Warsaw, 475.
Supplementary literature	Kajak Z., 1998. Hydrobiologia Limnologia, PWN, Warszawa, 336.Namieśnik J., Łukasiak J., Jamrógiewicz Z., 1995. Taking environmental samples for analyses, PWN, Warszawa, 280.Minczewski J., Marczenko Z., 2011. Analytical chemistry. Chemical methods of quantitative analysis, Vol. 2, PWNBrodecka-Goluch A. (ed.), 2023, Physicochemical research on natural waters, Ed. University of Gdańsk, Gdańsk, 170.Bielański A. General and inorganic chemistry, PWN, Warsaw
eResources addresses	

Example issues/ example questions/ tasks being completed	Explain the periodicity of the physical and chemical properties of elements in the periodic table.Explain the concept of strong electrolyte, weak electrolyte, give examples of strong acids and strong bases.Define the term colloid, give examples of colloidal systems in nature.Explain the concept of hydration and solvation.Define when we talk about a covalent, covalent-polar, ionic bond. Give examples of compounds in which such bonds occur.For what purposes are water samples taken for analysis, what rules should be followed when taking water samples and what should you pay attention to when collecting them.What basic physicochemical parameters are most often measured/studied as part of standard monitoring programs.Discuss how water samples should be collected and preserved for analysis of biogenic salts, dissolved oxygen and pH.What is ion balance and what is it used for?Discuss the nitrogen/phosphorus/ carbon biogeochemical cycle. How do oxygen conditions affect the course of these cycles?What determines the rate of inflow of organic matter into sediments in water reservoirs and what influences the rate of degradation of organic matter in water reservoirs?Discuss how pH affects carbonate balance.
Work placement	Not applicable

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