



Subject card

Subject name and code	Pollution of water resources and methods of their prevention, PG_00057717						
Field of study	Zanieczyszczenia zasobów wodnych i metody ich zapobiegania						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group		Optional subject group Subject group related to scientific research 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	6		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Anna Zielińska-Jurek				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	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	60		5.0		85.0	150
Subject objectives	According to the World Health Organization, one of the main goals of sustainable development is to ensure access to drinking water in the place of residence. Currently, 3 out of 10 people worldwide, a total of 2.1 billion people do not have access to clean drinking water, this problem also affects 100 million inhabitants of Europe. Therefore, the challenge of modern times is the effective protection of aquatic ecosystems, to maintain their good condition and reduce the negative impact on human and animal health. During the lectures, selected issues of modern chemical technology will be discussed - modern technologies of wastewater treatment, water recovery. As part of the course, the student will gain knowledge, skills and competences in the field of activities to improve the quality and protection of water against micropollutants, the functioning of the closed-loop economy as a solution to selected environmental problems of the modern world (pollution and consumption of drinking water resources). At the same time, they will gain theoretical, technological and engineering knowledge of an interdisciplinary nature regarding the sustainable management of water resources, advanced and innovative technologies of wastewater treatment, water recovery and valuable raw materials from wastewater and sewage sludge.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W04] is aware of the importance of environmental protection and has a basic knowledge of chemical and biological threats to the environment, with particular emphasis on anthropogenic factors, has a basic knowledge of knowledge of the principles of sustainable development as well as national and European environmental management conditions.	The student has knowledge provided during classes and from basic literature regarding threats resulting from the presence of environmental pollution of water resources, has knowledge of the principles of sustainable development and their implementation in water purification technology.	[SW2] Ocena wiedzy zawartej w prezentacji [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
	[K6_K03] turns the attention to the prestige associated with the profession and professional solidarity properly understood, shows respect for others and concern for their welfare	The student understands the importance of basic processes and unit operations in environmental protection	[SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce
	[K6_U05] can formulate and solve engineering tasks analytical methods, simulation as well as experimental, able to apply knowledge of basic physics and mathematics to analyze the results of experiments, is able to analyze and assess existing technical solutions	The student knows and understands terms related to pollution and purification of water resources.	[SU1] Ocena realizacji zadania [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu
	[K6_W03] has a basic knowledge of soil, air and water pollutants, design and supervision of environmentally friendly technologies and technologies which do not produce waste, knows technology of cleaning and neutralization of industrial waste and wastewater management, has a basic understanding of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants	The student has basic knowledge of pollutants present in water from surface and groundwater runoff and the methods and stages of water purification used in technology, as well as modern water purification methods constituting the so-called IV stage of purification.	[SW1] Ocena wiedzy faktograficznej [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
Subject contents	Course content – lecture 1. Pollution of inland waters, seas and oceans. Sources and types of water pollution. Characteristics of pollution 2. Mechanical, biological and chemical treatment of municipal wastewater. Sewage sludge - management and disposal. 3. Protection of water resources against eutrophication and industrial pollution. New directions in the technology of biological treatment of municipal sewage. 4. Rational management of water resources and sewage management in the light of the closed-loop economy. System solutions in the scope of closing and integration of water circuits and recycling of technological waters in municipal systems and production processes. 5. Technologies of sewage treatment, recovery of water and valuable raw materials from sewage. 6. New wastewater Directive concerning the collection, treatment and discharge of municipal sewage. Fourth stage of municipal wastewater treatment 7. Photochemical transformations in water. Application of advanced oxidation methods in water and sewage treatment technology. 8. Photocatalytic oxidation processes in water and wastewater treatment		
Prerequisites and co-requisites	The student has basic knowledge of the basics of environmental protection.		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lectures (exam)	60.0%	40.0%
	project	60.0%	35.0%
	laboratory	50.0%	25.0%
Recommended reading	Basic literature	Water Law scientific articles from journal databases	
	Supplementary literature	scientific articles from journal databases	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Application of advanced oxidation methods in wastewater technology		
	Propose and present (in the form of a schematic diagram of 4-6 unit operations) a method for treating wastewater containing heavy metals		
	Propose and present (in the form of a schematic diagram of 4-6 unit operations) a method for treating wastewater containing micropollutants, e.g. non-biodegradable pesticides		
	List and briefly describe the main technological indicators in wastewater treatment		
Practical activities within the subject	Not applicable		

Document generated electronically. Does not require a seal or signature.