



## Subject card

Subject name and code	PROTECTION OF ENVIRONMENTAL, PG_00043361						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
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	5	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Environmental Engineering Technology -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Magdalena Gajewska					
	Teachers	prof. dr hab. inż. Magdalena Gajewska dr inż. Magda Kasprzyk					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	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	5.0		20.0		55
Subject objectives	Understanding the principles of water management and conservation, and the cause - effect relationship of anthropogenic activity for water purity						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U01] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions	ability to self-educate, is able to obtain information from literature, databases and other sources, uses information technologies and Internet resources; is able to integrate the information obtained, interpret it, draw conclusions and formulate and justify opinions			[SU2] Assessment of ability to analyse information		
	[K6_W04] possesses elementary knowledge in the field of land mechanics, ground science, land reclamation and geotechnics; has basic knowledge about the composition of air, water and soil, environmental pollution and processes responsible for their formation and ways to reduce them, knows the principles and organization of sustainable water management	has basic knowledge about the composition of air, water and soil, environmental pollution and the processes responsible for their formation and methods of reducing them, knows the principles and organization of sustainable water resources management			[SW2] Assessment of knowledge contained in presentation		
[K6_W14] has a structured knowledge of current legal regulations regarding environmental protection, water and construction law; knows the basics of public procurement law, patent law, intellectual property protection and labor protection	has an organized knowledge of the current legal regulations regarding environmental protection, water law,			[SW3] Assessment of knowledge contained in written work and projects			

Subject contents	LECTURES: Polish and international law regulation and requirements for ground and underground water protection. Water as a crucial element for human beings and the environment. Classification of water quality. The role of local authorities in water protection. The characteristic of pollution sources. Eutrophication reasons and effect. Recultivation principles and methods. Phosphorus fractions and inactivation. Renaturalization of surface reservoirs- natural methods. See borne-trade as a potential source of water pollution. International agreements and cooperation towards water bodies protection. EXERCISE: Sources of water pollutions in Gdansk region. Analyses of industry influence on surface and ground water quality. Removal of phosphorous as a crucial point in wastewater treatment. Precipitation of phosphorous in natural water- recultivation. Microbiological pollution of surface water.			
Prerequisites and co-requisites	Good knowledge of the following subjects : Chemistry (SSPK7), Environmental protection (SSPK15)			
Assessment methods and criteria	Subject passing criteria		Passing threshold	Percentage of the final grade
	Lectures -written tests		55.0%	60.0%
	Tutorials -project in the form of the concept		50.0%	40.0%
Recommended reading	Basic literature	Laskowski R., Migula P.: Ekotoksykologia od komórki do ekosystemu. Warszawa: Państwowe Wydawnictwo Rolnicze i Leśne 2004. [2] Pempkowiak J.: Zarys geochemii morskiej. Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego 1997. [3] Pyłka-Gutowska E.: Ekologia z ochroną środowiska. Warszawa: Wydawnictwo Oświata 1998. [4] Zrównoważony rozwój w polityce i badaniach naukowych. Lublin: Zeszyty Naukowe 29. PAN Komitet Naukowy przy Prezydium PAN: Człowiek i środowisko. Politechnika Lubelska 2001.		
	Supplementary literature	Rozporządzenia i akty prawne oraz raporty, porozumienia i umowy międzynarodowe dot. ochrony wód.		
	eResources addresses	Adresy na platformie eNauczanie:		
Example issues/ example questions/ tasks being completed	<p>1. Explain the concept of sustainable development</p> <p>2. What does the term: water bodies mean</p> <p>3. Give the method of classification of the state of surface water bodies</p> <p>4. Specify what elements are assessed when classifying the cleanliness of surface waters</p> <p>5. Give the classification of the ecological status of surface waters</p> <p>6. What are the principles of water management in Poland?</p> <p>7. What are the water management instruments in Poland?</p> <p>8. Explain the concepts of transitional waters and coastal waters</p> <p>9. List the main sources of surface water pollution</p> <p>10. Describe the importance of air purity on water quality and the eutrophication process</p> <p>11. Give the reasons for the eutrophication process</p> <p>12. Explain the steps in the eutrophication process</p> <p>13. Explain the concept of "internal power" and explain the mechanism and factors triggering this process?</p> <p>14. Explain the importance of thermal stratification of lakes in the eutrophication process</p> <p>15. Explain the importance of the sorption capacity of sediments in terms of phosphorus</p> <p>16. What does the term reclamation mean?</p> <p>17. List the stages of the remediation process</p> <p>18. On what basis is the reclamation method selected?</p> <p>19. What does the term mean: internal power, interstitial waters</p> <p>20. Give the methods and types of reclamation</p> <p>21. List technical methods of reclamation</p> <p>22. Give examples of reclamation with high interference in the ecosystem of a water reservoir</p> <p>23. Give examples of reclamation with low interference with the ecosystem of a water reservoir</p> <p>24. What is and when can the "removal of hypolimnion water" be applied?</p> <p>25. Give and briefly describe methods of phosphorus inactivation in lake remediation</p> <p>26. Compare phosphorus inactivation in the water column and in bottom sediment, give advantages and disadvantages?</p> <p>27. Explain the principle of rehabilitation by phosphorus inactivation in bottom sediments?</p> <p>28. What are the advantages and disadvantages of rehabilitation with the use of dredging?</p> <p>29. What does the term stratified aeration mean?</p> <p>30. What does the term aeration without stratification mean?</p> <p>31. What are algatics and where are they used?</p> <p>32. What, where and for what purpose do we use biological methods of shore protection?</p> <p>33. When and where do we use technical methods of coastal protection?</p> <p>34. What does the term "filling" mean and how and where it is done</p>			
Work placement	Not applicable			