GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Environmental Protection, PG_00061889						
Field of study	Materials Engineering						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2024/2025			
Education level	first-cycle studies		Subject group	Obligatory subject group in the field of study 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	1		Language of instruction	Polish			
Semester of study	1		ECTS credits	1.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Anna Zielińska-Jurek				
	Teachers		prof. dr hab. inż. Anna Zielińska-Jurek				

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15	2.0	8.0	25

Subject objectives	
	Basic knowledge of environmental pollutant of water treatment technology,wastewater, air purification.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U06] can integrate obtained information, interpret it and draw conclusions, as well as formulate and justify opinions.	The student describes the fundamental technologies used for air and water purification. Describes ecosystems, industrial and symbiosis. The student understands the cause-and-effect relationship between anthropogenic pollution and the effectiveness of technology in eliminating environmental pollution.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_K01] Understands the need to improve professional and personal competencies; is conscious of own limitations and knows when to turn to experts, properly establishes priorities helping to accomplish tasks defined by oneself or others.	Student is able to define basic concepts in the field of environmental protection, search for information on the toxicity of substances and their impact on living organisms.	[SK5] Assessment of ability to solve problems that arise in practice
[K6_W03] Has knowledge of materials science and can relate the properties of materials with their structure and composition, knows the theoretical description of phenomena occurring in materials subjected to external factors.	The student is able to propose materials for the adsorption and absorption of pollutants present in the environment. Knows the theoretical basis of phenomena such as: eutrophication, photochemical smog, London-type smog, acid rain.	[SW1] Assessment of factual knowledge
[K6_W06] Knows selected methods, techniques, tools and materials used in solving simple engineering problems within the scope of materials engineering.	The student knows the basic technologies used to prevent the formation and degradation of pollutants present in water and air. Knows technological principles and green engineering principles and can propose materials and techniques for reducing environmental pollutant emissions.	[SW1] Assessment of factual knowledge

Subject contents

Ecotoxicology - history and basic concepts. Circuit nitrogen and carbon in nature. Homeostasis. Impact industrial processes on the environment Classification and sources of pollution. Circuit pollutants in nature.Toxicity and methods of absorbing poisons. Characteristics of contaminants: pesticides, dioxins, metalsheavy, radioactive elements, and oil derivatives. The impact of anthropogenic substances environment: eutrophication, the greenhouse effect. Sustainable development. Modern solutions in the field of sustainable development. Pollution prevention. Air purification technologies. Water and sewage treatment technologies. Sewage sludge management. Principles of environmentally friendly process engineering. Industrial ecosystems. A model industrial ecosystem in Kalundborg.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam 1	60.0%	50.0%
exam 2	60.0%	50.0%

Recommended reading

Basic literature	1. vanLoon G.W., Duffy S.J., Chemia Środowiska, PWN, Warszawa 2008 2. Mering L. Prawo ochrony środowiskaLEX 1998, Wydanie II 2. Namieśnik J., Jaśkowski J., Zarys ekotoksykologii, EKO-Pharma, Gdańsk, 1995
Supplementary literature	1. Matlack A.S., Introduction to green chemistry, Marcel Dekker, Inc. 2001 2. Łomotowski J., Szpindor A.Nowoczesne systemy oczyszczania ścieków, ARKADY 1999 3. Kowal A.L., Świderska-Bróż M., Oczyszczanie wody,PWN 1998
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

1. Characterize on three examples the factors determining the toxicity of xenobiotics
2. Explain and briefly describe the terms cleaner technologies and end-of-pipe activities.
3. Give examples, point out advantages and disadvantages. Name the source and impact of radioactive elements on the environment
4. Discuss the sources of dioxins in the environment
5. Explain the mechanism of formation and impact of acid rain on the environment
6. Based on example, please explain the concept of industrial symbiosis
7. List the devices used to remove contaminants from the gas phase
8. Explain the concepts of green engineering and, based on selected example, describe the 4th principle of green engineering - maximizing efficiciency
9. List and briefly describe spossible solution of NOx emission reduction

Work placement

Not applicable

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