GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Environmental Protection, PG_00072473		
Field of study	Materials Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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 -> Faculties of Gdańsk University of Technology		
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

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

eNauczanie source addresses:

Moodle ID: 9104 Ochrona środowiska
https://enauczanie.pg.edu.pl/2025/course/view.php?id=9104

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_K02] is ready to creatively use his competencies for the common good, including in an entrepreneurial manner	The student is prepared to undertake responsible actions for environmental protection, taking into account the impact of industrial and anthropogenic activities on the environment and human health. The student demonstrates awareness of the need to reduce pollutant emissions and ensure the rational management of environmental resources	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
[K6_U06] is able to integrate acquired information, interpret it, draw conclusions, and formulate and justify opinions using specialist terminology in writing or by actively participating in discussions	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_W03] has knowledge of materials science that enables one to relate the properties of materials to their structure and composition; is familiar with the theoretical description of phenomena occurring in materials subjected to external factors and understands the processes taking place throughout their life cycle	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] has knowledge of the principles of experimental design, experimental methods, measurement techniques, and the tools and materials used in solving complex engineering problems in 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

Course content – lecture

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	

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
Practical activites within the subject	Not applicable

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