GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00057808						
Field of study	Green Technologies						
Date of commencement of studies	October 2022		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	3		Language of instruction	English			
Semester of study	6		ECTS credits	4.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department Of Process Engineering And Chemical Technology -> Faculty Of Chemistry -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Anna Zielińska-Jurek				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	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	35.0		100
Subject objectives	Familiarization with the types of pollution and forms of environmental degradation, including water, air and soil. Analysis of methods for protecting the environment against pollution, especially those from anthropogenic sources. In addition, of particular interes are the cleaning, remediation and remediation methods. The final goal is the ability of studet to recognize the environmental hazard and select the appropriate method of its liquidation.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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 knowledge of soil cleaning methods and is able to propose an appropriate method for the type of contamination and assess the costs associated with the use of a given remediation method.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
[K6_U02] is able to operate equipment and perform typical analyzes of studies of environmental pollution, is able to carry out an analysis of typical environmental pollution and simple devices according to specification	Knowledge of analytical methods used to study the physicochemical properties of soil pollutants (heavy metals, petroleum derivatives, pesticides, pharmaceuticals), and knowledge of soil and land remediation technologies.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K6_K05] is ready to initiate actions for public interest, preparation of social projects (economic, civil, political).	When solving a given problem, he/she is aware of the non-technical (ethical, scientific and social) consequences of the proposed solutions	[SK5] Assessment of ability to solve problems that arise in practice
[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.	Student knows the basic principles of production quality control, and is able to analyze the results, also knows the basic aspects regarding chemical management with particular attention on compounds polluting the environment in relation to economic activity	[SW1] Assessment of factual knowledge

Subject contents

Introduction to Environmental Remediation Technologies, Classification and sources of environmental pollution. Ecological footprint, Characteristics of pollutants: heavy metals, The impact of industrial processes on the environment, Characteristics of pollutants: pesticides, petroleum product, Soil characterization and sorption process (mechanical, physical, chemical and biological), Physicochemical processes related to migration pollution. Transmission of harmful substances in the environment, Remediation Technologies, The use of surfactants for soil remediation, Environmental Lifecycle of the Product, Physico-chemical methods of soil remediation in in-situ conditions, Mobility of cations in soils, Soil recultivation.

Prerequisites and co-requisites

- basic knowledge in the field of environmental protection,

- basics of chemistry, physics

- knowledge of basic physicochemical parameters

- ability to assess environmental issues

- the ability to logically assess the situation

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	60.0%	40.0%
Lecture	60.0%	60.0%

Recommended reading

Basic literature	Hasegawa, Hiroshi, M. M. Rahman, Ismail, Rahman, Mohammad Azizur (Eds.) 2016. Environmental Remediation Technologies for Metal-Contaminated Soils
Supplementary literature	Zadroga B., Olańczuk-Neyman K., Ochrona i rekultywacja podłoża gruntowego, Wydawnictwo Politechniki Gdańskiej, 2001 Szyc J., Odcieki ze składowisk odpadów komunalnych, Wydawnictwo Naukowe Gabriel Borowski, Warszawa 2003 Olszanowski A. (red.), Remediacja i bioremediacja zanieczyszczonych wód i gruntów oraz wykorzystanie modelowania i technik informatycznych w inżynierii, Wydawnictwo Politechniki Poznańskiej, 2001.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	The impact of industrial processes on the environment. Environmental Geochemistry Ecological Footprint REACH Characteristics of pollutants: pesticides, petroleum products. Soil characterization and sorption process (mechanical, physical, chemical and biological). Physicochemical processes related to migration pollution. Transmission of harmful substances in the environment
Work placement	Not applicable

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