


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Environmental protection in chemical industry		13.3.0746	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	all
Faculty of Chemistry	Chemical Business	form	all
		specjalty	all
		specialization	all
Teaching staff			
dr inż. Anna Malankowska; dr inż. Aleksandra Pieczyńska			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		2	
Laboratory classes, Lecture		classes - 30 h	
The realization of activities		tutorial classes – 5 h	
classroom instruction		student's own work – 15 h	
Number of hours		Total: 50 h - 2 ECTS	
Laboratory classes: 15 hours, Lecture: 15 hours			
The academic cycle			
2025/2026 winter semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
- conducting experiments - multimedia-based lecture		Final evaluation	
		Graded credit	
		Assessment methods	
		Assessment methods	
		Written test with open questions (tasks)	
		Laboratory:	
		-execution of a specific practical work and presentation of results in the form of a report (written)	
		-activity during classes	
		-written test including the topics mentioned in the program contents of the laboratory	
		The basic criteria for evaluation	
		Lecture:	
		positive grade from the written exam covering the subjects mentioned in the lecture program; the grade scale according to the UG Study Regulatory;	
		oral examination – supplement of the written test, only for the students which receive >45% points from written test	
		Laboratory exercises:	
		• Presence at laboratory classes and carrying out exercises in accordance with the instructions.	
		• Positive written test covering the issues listed in the contents of the laboratory exercises, the scale is in line with the University of Gdańsk's Study Regulations	
		• Positive the written report about performed laboratory exercises	

Method of verifying required learning outcomes	
Required courses and introductory requirements	
A. Formal requirements Basic knowledge of chemistry	
B. Prerequisites Basic knowledge of chemical technology	
Aims of education	
<ol style="list-style-type: none"> 1. Familiarize students with the ways of pollution spreading from industry. 2. Familiarize students with wastewater, air and soil methods treatment, coming from industry. 3. The ability to present the results in writing form. 4. The ability to independently carry out the experiment in laboratory. 5. The ability to use the methodology given in the instructions and the interpretation of the obtained results. 	
Course contents	
Course contents Lectures: The current state of air, water and soil pollution in the country in the aspect of industry impact. The spread of pollutants in the atmosphere, water and soil. The impact of selected industrial pollutants on living organisms. Classification, characteristics and sources of industrial waste generated in the technological process. The quality parameters of waste gases. Selected methods for reducing of pollutants in waste gases; dust removal, SO ₂ , NO _x and hydrocarbons removal. Odor removal. Soil and its protection. Selected methods of utilization and neutralization of industrial waste. Parameters of quality of industrial wastewater. Characteristics of wastewater generated in selected industry. Wastewater treatment: raw material recovery, neutralization, precipitation, sedimentation, flotation, coagulation, oxidation and reduction, biological wastewater treatment. Selection of appropriate treatment methods depending on the quality of sewage. Discussion of selected wastewater treatment technologies coming from selected industries (refinery, textile, food, etc.). Laboratory: Laboratory experiments related to the soils, sewage, leachate and air treatment. Removal of sulfur compounds from air and flue gases - sulfur dioxide absorption test in a spray scrubber. Ozonation of an aqueous solution of phenol. Removal of phosphorus and iron compounds.	
Bibliography of literature	
A. Literature required for the final completion of the course (passing the exam): A.1. used during classes A.2. studied independently by the student B. Supplementary literature: <ol style="list-style-type: none"> 1. Głowiak B.: Podstawy ochrony środowiska, PWN, Warszawa 1985. 2. Koniecznyński J.: Oczyszczanie gazów odlotowych, Politechnika Śląska, Gliwice 1990. 3. Materiały dotyczące przedmiotu publikowane w czasopiśmie: Ochrona Powietrza i Problemy Odpadów, Ochrona Środowiska, Chemik, Przemysł Chemiczny. 4. Zaleska A., Zielińska-Jurek A., Technologie remediacji gruntów, Wydawnictwo PG, Gdańsk 2013. 5. Kowalik P., Ochrona środowiska glebowego, PWN, Warszawa, 2001. 6. Zadroga B., Olańczuk-Neyman K., Ochrona i rekultywacja podłoża gruntowego Wydawnictwo Politechniki Gdańskiej, 2001. 7. Gworek B (red), Technologie rekultywacji gleb, Wydawnictwo Naukowe Gabriel Borowski, Warszawa 2004. 	
The learning outcomes (for the field of study and specialization)	Knowledge
	Student: <ol style="list-style-type: none"> 1. classifies and lists the basic sources of pollution of individual elements of the ecosystem 2. lists the ways of pollutants spread in the environment and the global and local effects of its pollution 3. lists and characterizes basic technologies used for soil remediation 4. lists and characterizes the basic technologies used for air purification 5. lists and characterizes the basic technologies used for wastewater treatment 6. applies basic technological and chemical concepts describing environmental remediation technologies 7. discusses the advantages and disadvantages of selected water, soil and wastewater treatment technologies.
	Skills
	<ol style="list-style-type: none"> 1. The student follows the established research procedures.

2. Student recognizes the laboratory equipment and uses it to carry out experiments.
3. Student in an understandable way shows the correct technology.
4. Student observes research procedures.
5. Student performs the analysis of the selected parameter based on the laboratory procedure.
6. Student predicts, verifies and criticizes the results of experiments.

Social competence

1. Student understands the necessity of sewage, soil and air treatment.
2. Student understands the necessity of life-long learning a personal development.
3. Student shows creativity in independent and teamwork

Contact

anna.malankowska@ug.edu.pl