GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Environment protection, PG_00020943		
Field of study	Nanotechnology		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
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	Division of Electrochemistry and Surface Physical Chemistry -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jacek Ryl	
	Teachers	dr hab. inż. Jacek Ryl	

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	1.0	9.0	25

Subject objectives

Make students aware of the impact of human productive activity on the natural environment. Overview of the principles of sustainable development. Presentation of the role of engineers in developing tools and technologies allowing for more effective environment protection.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U10	The student is aware of the impact of nanomaterials on the environment at every stage of the life cycle	[SU5] Assessment of ability to present the results of task
[K6_K71] is conscious of the need to apply knowledge from humanistic, social, economic or legal sciences in order to function in a social environment	the student understands the role of engineering and modern technologies to ensure sustainable development	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents

Human impact on the environment. Types and sources of water, soil and air pollution. Circulation of resources in the environment. Global, local and point environmental threats.Evolution of environmental protection. Environmental protection strategies: conservative, technological and planning.The idea of sustainable development. The role of material engineers in shaping changes, designing materials and technological processes.Available sources of energy, their harmfulness to the natural environment, materials and technologies related to obtaining energy, energy efficiency of processes.Maximizing the efficiency of using energy, time, mass and space.Principles of green chemistry, toxicity and biodegradability of materials, Protection against corrosion.Circular economy. Recycling. Process automation (drivers, management systems, monitoring).

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>oral presentation</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Writing test</td><td>60.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. J. Krystek, Ochrona środowiska dla inżynierów, PWN 2018
2. M. Popkiewicz i inni, Nauka o klimacie, Wydawnictwo Nieoczywiste, 2019
3. W. Adamczyk; Ekologia wyrobów; PWE 2004
4. Z. Kowalski, J. Kulczyńska, M. Góralczyk; Ekologiczna ocena cyklu życia procesów wytwórczych (LCA), PWN 2007
5. K. Małachowski; Gospodarka a środowisko i ekologia, CeDeWu, 2011
6. Z. Wnuk; Ekologia i ochrona środowiska. Wybrane zagadnienia., Wydawnictwo Uniwersytetu Rzeszowskiego, 2011</td></tr>
<tr><td>Supplementary literature</td><td>JCR articles</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Ochrona Środowiska 22/23 - Moodle ID: 23259
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23259</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">The life cycle of the selected product.

Types of impacts on the environment at the stage of manufacture of the selected material.

The use of ecodesign principles on the example of the selected product.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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