GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biologically induced corrosion, PG_00039748		
Field of study	Materials Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Optional subject group 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	Polish
Semester of study	5	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Chemistry Technology and Biotechnology of Food -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Filipkowski	
	Teachers	dr inż. Paweł Filipkowski	

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: 2639 25/26 Biokorozja (IM)
https://enauczanie.pg.edu.pl/2025/course/view.php?id=2639

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

The aim of the lecture is familiarizing of students with machanisms of corrosion inducing by microorganisms.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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.	Students can relate the properties of materials to their structure and composition. They can predict the potential impact of microorganisms on structural components.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
[K6_W02] has knowledge of physics and chemistry, useful for formulating and solving simple problems within the scope of materials science	For example, the student is able to select materials for the expected conditions or identify hazards.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents

Course content – lecture
General characteristic of microrganisms occurring in natural environment, particularly the microrganisms in the soil and water. Nutrition requirements and growth. Effect of environmental factors on microrganisms temperature, pH, oxidation-reduction potential, water activity, hydrostatic pressure. Microrganisms and environment: ecosystems, kinds of interactions among microorganisms. Corrosion induced by microorganisms: - prokaryotic: sulphate reducing bacteria; sulphur oxidizing bacteria and bacteria oxidizing reduced sulphate compounds; iron bacteria; biofilms producing bacteria, - eukaryotic: fungi, algae. Ways of corrosion inducing by microrganisms; modification of the enmviroment on the metal/solution interface by products of microbial metabolism, biofilm formation. Characteristics of biofilm and biofouling. Microbial inhibition of corrosion: mechanisms (neutralization effects of corrosive substances, forming protective films on a metal surface, decreasing the medium corrosiveness. General characteristic of the methods of detection, identification and monitoring of biocorrosion: control and analysis of biocorrosion, monitoring on line, chemical and physical analysis of water, chemical analysis of biofouling, detection and quantification of microorganisms. Prevention of biocorrosion: mechanical and chemical cleaning, biocides, corrosion inhibitors.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">General biological knowledge. Knowledge from the courses of Basis of Corrosion and Corrosion Protection Technologies</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Written test</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Videla H. A. Manual of Biocorrosion. Lewis Publishers, 1996. 2. Borenstein S. Microbiologically Influenced Corrosion Handbook, Woodhead Publishing Ltd., London, 1994.

2. UhligS corrosion handbook und. RV Revie. Willey 3rd, 2011</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Schlegel H. S. Mikrobiologia ogólna. PWN, Warszawa, 2000, (Selected problems)</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3"></td></tr>
<tr><td>Practical activites within the subject</td><td colspan="3">Not applicable</td></tr>
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