GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biologically induced corrosion, PG_00039748		
Field of study	Materials Engineering, Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2024/2025
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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Filipkowski	
	Teachers		

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

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_U06	Is able to integrate the information obtained on microorganisms causing biocorrosion and draw conclusions, formulate and justify opinions based on, for example, microscopic observations of surfaces or cells	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
K6_K01	understands the need to improve professional and personal competences; is aware of his/her own limitations and knows when to turn to experts, is able to define priorities appropriately, e.g. to combat biocorrosion phenomena	[SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work
K6_W07	has detailed knowledge related to selected issues related to materials subject to biocorrosion	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents

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.

Prerequisites and co-requisites

General biological knowledge. Knowledge from the courses of Basis of Corrosion and Corrosion Protection Technologies

<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>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>1. Videla H. A. Manual of Biocorrosion. Lewis Publishers, 1996. 2. Borenstein S. Microbiologically Influenced Corrosion Handbook, Woodhead Publishing Ltd., London, 1994.

2. Uhlig’S corrosion handbook und. RV Revie. Willey 3rd, 2011</td></tr>
<tr><td>Supplementary literature</td><td>1. Schlegel H. S. Mikrobiologia ogólna. PWN, Warszawa, 2000, (Selected problems)</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2"></td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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