GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	High Temperature Corrosion, PG_00039703		
Field of study	Materials Engineering, Materials Engineering, Materials Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Electrochemistry, Corrosion and Materials Engineering -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Andrzej Miszczyk	
	Teachers	dr hab. inż. Andrzej Miszczyk	

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	10.0	25.0	50

Subject objectives

The aim of the course is to acquire the ability to recognize and describe the manifestations of high-temperature corrosion, to understand its mechanisms, to learn about research methods and methods of protection or minimizing its effects.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K7_W06	He has knowledge in the field of materials science.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
K7_U01	He can determine the suitability of scientific methods and apparatus to obtain specific information in the field of materials engineering.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
K7_K01	He has knowledge in the field of materials engineering and related fields. He can present in a comprehensible way scientific achievements in the field of materials engineering.	[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work
K7_W04	The ability to present knowledge and the effects of own work. Good communication. Having self-assessment skills and constructive criticism.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents

Electrical properties of metals and their compounds. Basics of high temperature oxidation. Diffusion processes in solid bodies. Diffusion processes in oxides. The mechanism of oxidation in thin layers. Thick-layer oxidation. Wagner's theory of oxidation. Oxidation of pure metals. Oxidation of alloys. Oxidation in mixed environments. "Hot" corrosion. Negative scale descaling. Coatings resistant to high temperatures. High temperature corrosion problems in industry. Books on high-temperature corrosion.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Knowledge of the fundamentals of corrosion. Knowledge of the basics of physical chemistry. in particular, atomic and molecular structures, bonds. Basic knowledge of physics and the basics of quantum mechanics and the basics of chemistry</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">S. Mrowec, T. Weber, Korozja gazowa metali, Wydawnictwo "Śląsk", Katowice 1975,

High Temperature Corrosion, vol. 1 and 2, Elsevier ed. A.S. Khanna, Introduction to high temperature oxidation and corrosion, ASM International, 2002,

High Temperature Oxidation and Corrosion of Metals by David John Young, Elsevier 2008.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">there are no requirements</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">Diffusion phenomena in solid state. Kinetics of growing scale layers on metals and alloys. Scale in the presence of oxygen and / or sulfur compounds. Wagner theory. Raid layers. High temperature corrosion test methods. High-melting metals. Protection methods in high-temperature corrosion. Examples of high-temperature corrosion in industry.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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