GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00065825		
Field of study	Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	
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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Corrosion and Electrochemistry -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Stefan Krakowiak	
	Teachers	dr hab. inż. Stefan Krakowiak	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=3852

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	30	8.0	37.0	75

Subject objectives

To provide the student with knowledge of the main technologies of corrosion protection: coating protection, cathodic protection, corrosion inhibitors, selection of construction materials.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K02] Is aware of the importance of non-technical aspects and effects of engineering, including the influence on the environment and resulting responsibility for the decisions.	The student is able to link the selected anti-corrosion protection technology with increased environmental safety.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_W04] Has enhanced knowledge of materials sciences, within the scope required for describing and understanding the correlation between the chemical composition, structure and mechanical and physical properties.	The student selects a method of protecting the structure based on knowledge of the physical properties and resistance of the structure's material in a corrosive environment.	[SW1] Assessment of factual knowledge
[K7_U04] Can undertake a detailed analysis of the obtained results and develop a technical report or presentation, also in English.	Based on the results obtained in the laboratory or in the field, the student indicates the most effective method of protecting the structure against corrosion.	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_W05] Knows methods, techniques, tools and materials for solving complex engineering tasks relevant to materials engineering.	The student uses electrochemical and exposure methods to select the best construction materials and methods for corrosion protection of industrial structures.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture

Coating protection, coating types, application methods, and inspection methods.

Cathodic protection of underground and offshore structures, cathodic protection technologies (galvanic anodes, external power source), protection criteria, anodic alloys, practical methods of implementing cathodic protection. Stray current protection.

Inhibitor protection, classification of corrosion inhibitors, applications.
Selection of construction materials, review of modern materials used in industrial installations, resistance of construction materials in various environments.

Course content – laboratory

Corrosion Cells.
Ingredients of Paints and Varnishes. The Role of Pigments.
Application and Testing of Coating Protection.
Electroplating Coatings.
Modification of Corrosive Environments.
Temporary Protection of Metals against Corrosion.
Cathodic and Sacrificial Protection.

Prerequisites and co-requisites

Knowledge of the basics of corrosion.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Passing the lectures	60.0%	50.0%
Passing the laboratory	100.0%	50.0%

Recommended reading

Basic literature	Y.I. Kuznetsov, A.D. Mercer, J.G.N. Thomas, Organic Inhibitors of Corrosion of Metals, Springer US, 1996 A. Philip, P.E. Schweitzer, Atmospheric Degradation and Corrosion Control, CRC Press, 1999 R. Juchniewicz, Anti-corrosion technology, part 1, 2
Supplementary literature	K. Żakowski, K. Darowicki - Cathodic Protection, PG Publishing House A. Miszczyk, M. Szociński, K. Darowicki, Paint Coatings in Anticorrosion Protection. Principles of Application and Quality Control, PG Publishing House
eResources addresses	

Example issues/ example questions/ tasks being completed

Principles of paint application.

Potential criteria for cathodic protection.

Galvanic anodes used to protect marine structures.

Principles of selection of construction materials.

Classification of corrosion inhibitors.

Practical activites within the subject

Not applicable

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