



Subject card

Subject name and code	CONSTRUCTIONAL MATERIALS IN THE CHEMICAL INDUSTRY. CORROSION, PG_00064406						
Field of study	Chemistry						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2026/2027		
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		2.0		
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		prof. dr hab. inż. Kazimierz Darowicki				
	Teachers		prof. dr hab. inż. Kazimierz Darowicki 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/moodle/course/view.php?id=27331						
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		2.0		18.0	50
Subject objectives	Linking structure and alloys with their properties. Familiarization with the basic types of corrosion and corrosion protection methods.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_K04] is able to identify and resolve dilemmas related to the chemical engineering profession while respecting traditions and ethical principles		is ready to solve problems related to the practice of the chemical engineering profession.		[SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice		
	[K6_W04] identifies the conditions of chemical processes occurring in the analysed systems through the appropriate selection of methods to solve them, by taking into account the interdependence of the structure and properties of key materials in sustainable development technologies		has knowledge to select methods and materials suited to operating conditions.		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U03] operates typical laboratory apparatus and carries out analyses to identify chemical compounds and materials, integrating computational methods and application software		is able to operate laboratory equipment, conduct analyses to identify chemical compounds and materials, and apply appropriate computational methods and software.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		

Subject contents	Course content – lecture -Energy band theory of metals, semiconductors and dielectrics. -Electric, magnetics and thermal properties of metals. -Types of crystal lattice of solids. -Solid solutions. -Alloys and phase transitions, heat treatment. -Iron-carbon phase diagram. -Classifications of steels and cast irons. -Basics of thermodynamics and chemical kinetics. -Types of corrosion failures. -Corrosion: general, selective, intergranular, pitting, crevice. -Stress corrosion cracking and corrosion fatigue.		
	Course content – laboratory 1. Metal corrosion science. 2. Corrosion cells. 3. Corrosion of stainless steels. 4. Macro and micro assessment of corrosion damage. 5. Application of paint coatings. 6. Testing of painted products. 7. Water diffusion in engineering materials. 8. Testing the corrosion rate. 9. Physical properties of metals.		
Prerequisites and co-requisites	Chemical bonds, theory of solutions, chemical thermodynamics, basics of quantum chemistry.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture: passing two written tests	60.0%	50.0%
	Laboratory: passing the pre-lab quizzes	60.0%	50.0%
Recommended reading	Basic literature	Ch.A.Wert, R.M. Thomson, Fizyka ciała stałego, PWN Warszawa 1974 J. Dereń, J. Chaber, R. Pampuch, Chemia ciała stałego, PWN Warszawa 1977 L.L. Shreier, R.A. Barman, G.T. Burstein, Corrosion , Butterworth, London 1994 P.A. Schweitzer, Fundamentals of Metallic Corrosion, CRC Press, London 2007	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Discuss the iron-carbon phase diagram. List the types of corrosion damage. What kind of crystallographic networks do you know		
Practical activities within the subject	Not applicable		

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