University of Gdańsk

Subject card

Subject name and code	Monographic lecture – Application of oxidation processes in chemistry, PG_00080864		
Field of study	Chemistry		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	3	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit	Laboratory of Advanced Oxidation Processes -> Department of General and Inorganic Chemistry -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Ewa Siedlecka	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30	5.0	40.0	75

Subject objectives	presentation of the development of physicochemical research in solid and liquid phases over the last century, familiarization with basic instrumental methods used in the characterization of substances tested in scientific works, presentation of the diversity of scientific works carried out under the supervision of KChOiN employees, development of skills in independent planning of experimental work and solving problems, preparation for independent selection of scientific literature, leading consequently to the preparation of a master's thesis.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	Can classify radicals and radical reactions; divides AOP methods depending on the generating hydroxyl radicals method; lists the applications of radicals, chemical entities of an oxidation-reduction nature and their reactions in environmental protection, medicine, and chemical synthesis; can list methods commonly used in the analysis and diagnostics of radical reactions; understands the description and course of AOP processes; characterizes and understands the electron transfer process; explains and translates the relationships between the structure of a compound and its oxidation-reduction activity.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	can indicate the applied nature of the issues discussed and the critical events (cases) analyzed; discusses the potential usefulness of a business platform using innovative methods using radicals and individual chemical factors of an oxidizing-reducing nature.	[SK1] oral statement/conversation/ discussion [SK2] presentation/project/paper/ report
[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.	maintains the relationships between the topics presented in the lecture and life;	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.	Understands the interpretation of results presented in scientific papers;	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

Subject contents

Radicals and their types, radical reactions, the role of radical reactions in nature, division of advanced oxidation methods (AOP), methods of generating radicals and other chemical entities with oxidant and reductant characteristics, application of AOP in water treatment, application of AOP in wastewater treatment, application of reduction processes for fuel production, application of radicals in medicine, application of radicals in chemical synthesis, antioxidant activity of natural and synthetic compounds, including complex compounds, factors determining antioxidant activity of compounds.

Prerequisites and co-requisites

knowledge of: general, inorganic, analytical and coordination chemistry; knowledge of instrumental methods for characterizing chemical substances; knowledge and ability to use computer programs: Microsoft Office package and Chem Office package.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
performing tasks assigned by the teacher	51.0%	80.0%
activity during classes	51.0%	20.0%

Recommended reading

Basic literature	A. Bielański Podstawy chemii nieorganicznej J. D. Lee Zwięzła chemia nieorganiczna P. Pauling, P. Pauling Chemia G. Griffin Research methods for English studies L. Arnaut, S. Formoshino, H. Burrows Chemical kinetics from molecular structure to chemical reactivity R. J. Willson Isothermal microcalorimetry: theoretical development and experimental studies A.2. studiowana samodzielnie przez studenta J. Inczedy Równowagi kompleksowania w chemii analitycznej A. Hulanicki Reakcje kwasów i zasad w chemii analitycznej H. S. Rossotti, F.J.C. Rossotti Równowagi jonowe F. A. Cotton, G. Wilkinson, P.L. Gaus Chemia nieorganiczna.Podstawy A. Bartecki Barwa związków metali A. Frost, R. Pearson Kinetics and mechanism
Supplementary literature	B. Additional literature A. Bartecki Chemia pierwiastków przejściowych S.F.A Kettle Fizyczna chemia nieorganiczna na przykładzie chemii koordynacyjnej J. Polster, H. Lachmann Spectrometric titrantions: analysis of chemical equlibria
eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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