

Subject card

Subject name and code	Advanced chemistry laboratory - bioinorganic chemistry, PG_00054409						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study 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	1		ECTS credits		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Laboratory of Physicochemistry of Coordination Complexes -> Department of General and Inorganic Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Aleksandra Tesmar				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	20.0	0.0	0.0	20
	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	20		1.0		4.0	25
Subject objectives	-to introduce students to advanced techniques for testing chemical compounds commonly used in various industries, in scientific research and in company quality control laboratories- familiarizing students with the methods of planning experiments, interpreting the obtained data and how to visualize and present the obtained results- presentation of the most important contemporary issues related to the study of the thermodynamics of chemical compounds- developing the ability to experiment independently						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEMMU2_W03] Demonstrates extended knowledge in the field of modern measuring techniques used in chemical analysis.	recognizes and characterizes methods, techniques and research tools used in chemistry; selects appropriate research methods to perform the task, knows and applies safety and hygiene rules when performing work at a research or measurement station in the laboratory or in the field.	[SW5] implementation of a problem task
	[CHEMMU2_U02] Critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors.	- The student is critical in expressing opinions on the results obtained during research and is open to the opinions of co-discussants. - The student critically selects source texts to conduct a reliable analysis of his or her own data.	[SU1] oral statement/conversation/discussion [SU2] presentation/project/paper/report
	[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.	The student knows and understands spectroscopic methods at an advanced level, constituting basic general knowledge in the field of analytical methods of chemical compounds.	[SW1] oral statement/conversation/discussion
	[CHEMMU2_U01] Plans and implements chemical experiments of medium complexity.	demonstrates the ability to conduct experiments related to the subject of classes; uses simple and advanced methods, techniques and tools to achieve intended goals, searches information fluently in the literature on the subject (Polish and English)	[SU5] implementation of a problem task
	[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	The student is ready to: -critical assessment of knowledge and received content; -recognizing the importance of knowledge in solving cognitive problems and practical, and seeking expert opinion in case of difficulties with solving the problem yourself.	[SK1] oral statement/conversation/discussion
	[CHEMMU2_W10] Uses knowledge of the principles of operation of the basic scientific and research apparatus used in chemistry.	- Student: lists and describes methods of analysis and/or methods of computer theoretical calculations used during the implementation of a research project. Distinguishes and characterizes individual experimental/IT techniques used during the implementation of a research project. Identifies scientific and research equipment used during the implementation of a research project and explains the principles of their use.	[SW1] oral statement/conversation/discussion
	[CHEMMU2_U08] Prepares and presents oral presentations in various fields of chemistry in Polish and English, using acquired knowledge and skills as well as basic sources of scientific information.	It presents facts from chemistry and related fields in an accessible way, using scientific language typical of chemical sciences.	[SU2] presentation/project/paper/report
	[CHEMMU2_W07] Selects experimental and theoretical techniques to the extent necessary to understand the description and modelling of medium complexity chemical processes.	demonstrates substantive preparation for using chemical literature, demonstrates extended skills in understanding scientific texts in the field of chemistry both in Polish and English; develops and uses literature information on scientific topics related to his experimental work	[SW4] test/exam - oral or written
Subject contents	Getting to know various laboratory techniques used to study complex compounds. Presentation of methods for studying the equilibria and thermodynamics of chemical compounds in solutions. Construction and principle of operation of modern, advanced measurement instruments (set for conductometric and potentiometric titration, isothermal titration calorimeter). The use of various buffer solutions to prepare biological samples for chemical tests. Familiarization with the use of computer programs used to analyze and present the obtained results.		
Prerequisites and co-requisites	Completed course in general, inorganic, organic and analytical chemistry.		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Active participation in classes	100.0%	25.0%
	Written examination	51.0%	50.0%
	Written report	51.0%	25.0%
Recommended reading	Basic literature	L. Stryer, J. L. Tymoczko, J. M. Berg, Biochemistry, PWN, Warszawa 2005	
	Supplementary literature	J.D. Lee Concise Inorganic Chemistry, Wiley-Blackwell, 1999	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Determination of thermodynamic parameters of the reaction of complexation of selected ions with ethylenediaminetetraacetic acid.2. Thermodynamic characteristics of the interaction of cytidine-2-monophosphate with ribonuclease A.3. Determination of the heat of dissociation of weak organic acids.		
Work placement	Not applicable		

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