



Subject card

Subject name and code	, PG_00038999						
Field of study	Chemistry						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional 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	1	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Inorganic Chemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Anna Dołęga					
	Teachers						
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	30.0	45
	E-learning hours included: 0.0						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18883						
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	45	5.0	25.0	75		
Subject objectives	The aim of the course is to equip students with the basic knowledge of coordination chemistry and bioinorganic chemistry.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_W03	The student knows how the electronic configuration of transition metals determines the structure of coordination compounds and their physicochemical properties.			[SW1] Assessment of factual knowledge		
	K7_U01	The student learns to complete knowledge based on databases, literature both in Polish and English.			[SU3] Assessment of ability to use knowledge gained from the subject		
	K7_K01	Student is aware of the connections between chemical and related sciences as well as the necessity to broaden their knowledge			[SK2] Assessment of progress of work		
K7_W02	The student knows how the entropy and enthalpy factors influence the stability of the coordination compounds. The student knows and understands the influence of various electrostatic components on the stability of coordination compounds. The student understands the influence of the electronic structure of the coordination compound on its lability in solution.			[SW1] Assessment of factual knowledge			

Subject contents	Lecture: <ol style="list-style-type: none"> 1. Fundamentals of coordination chemistry: theories of the structure of coordination compounds, isomerism. 2. Thermodynamics and kinetics - equilibrium in solutions of coordination compounds, stability and lability of complex compounds. 3. Structure and types of coordination relationships. Central atom and ligands. 4. Bonding theories, magnetic properties and electron spectroscopy of coordination compounds. 								
Prerequisites and co-requisites									
Assessment methods and criteria	<table border="1" data-bbox="448 367 1489 439"> <thead> <tr> <th data-bbox="448 367 794 405">Subject passing criteria</th> <th data-bbox="794 367 1141 405">Passing threshold</th> <th data-bbox="1141 367 1489 405">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 405 794 439">Lecture - tests</td> <td data-bbox="794 405 1141 439">50.0%</td> <td data-bbox="1141 405 1489 439">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lecture - tests	50.0%	100.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Bielański A., Podstawy chemii nieorganicznej. PWN, Warszawa, 2010 2. Roat-Malone R.M.: Bioinorganic Chemistry. PWN, Warszawa, 2010 							
	Supplementary literature	Maria Cieślak-Golonka, Dr Jan Starosta, Marek Wasielewski, Wstęp do chemii koordynacyjnej, PWN, Warszawa, 2021							
	eResources addresses	Adresy na platformie eNauczanie:							
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Why is copper hydroxide, insoluble in water, easily dissolved in ammonia solution? Write down the reaction equation. 2. What are chelate complexes? Give an example of such a complex - write down its formula. 3. Diaminadichloroplatin (II) has two isomers and diaminadichlorozinc (II) only one. What is the coordination geometry of these metal ions in the complex compounds mentioned? Draw and name both isomers of the platinum complex. 4. Using the example of tetraaminecopper(II) write down the steps of complex formation and the expression describing the cumulative stability constant of the complex. 5. The following is a spectrochemical series of ligands: weak field ligands $I^- < Cl^- < OH^- < F^- < H_2O < NH_3 < CO / CN^-$ strong field ligands. Which of the following ligands is more likely to form a high-spin complex, Cl or CN⁻? 6. In addition to a more intense color, the tetrahedral manganese (II) complexes are often green, while the octahedral complex $[Mn(H_2O)_6]^{2+}$ is pale pink. Why? 7. Calculate the concentrations of Ag⁺ ions and NH₃ ammonia molecules present in a 0.01M $[Ag(NH_3)_2]Cl$, solution, which contains an additional 0.2 M ammonia. 8. The spin magnetic moment of the complex compound can be calculated from the number of unpaired electrons ("spin-only"). What is the approximate magnetic moment of the copper (II) complexes? 								
Work placement	Not applicable								