

Subject card

Subject name and code	Monographic lecture - Quantum chemistry of molecular anions, PG_00050896						
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	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Sylwia Freza				
	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	To familiarize students with the basic types of molecular anions and the possibilities for their applications						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.		understands the need for further education,		[SK1] oral statement/conversation/discussion		
	[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.		Explains the reasons for the stability of negative ions		[SW1] oral statement/conversation/discussion		
	[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.		defines the basic types of molecular anions		[SW1] oral statement/conversation/discussion		
	[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.		Describes computational methods used nowadays for the study of anions.		[SW1] oral statement/conversation/discussion		
Subject contents	Elements of the electronic structure of molecular anions, basic features of molecular anions, classification of anions based on the criterion of the potential responsible for binding the excess electron, characteristics of anions such as valence, multipole bound, resonance, multiply charged, cluster, double Rydberg, and systems solvating the excess electron.						
Prerequisites and co-requisites	quantum chemistry, basic knowledge about the structure of molecules and chemical bonds						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	oral examination		51.0%		100.0%		

Recommended reading	Basic literature	Theoretical Prospects of Negative Ions, ed. J. Kalcher, Research Signpost, Trivandrum, 2002, An Introduction to Theoretical Chemistry, Jack Simons, Cambridge University Press, 2003.
	Supplementary literature	Jack Simons, Molecular Anions Perspective , J. Phys. Chem. A (2023)
	eResources addresses	
Example issues/ example questions/ tasks being completed	Classification of molecular anions	
Work placement	Not applicable	

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