


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Monographic lecture - Electronic structure of molecular anions		13.3.1316	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	drugiego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	Digital Chemistry
		specialization	wszystkie
Teaching staff			
prof. dr hab. Piotr Skurski			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Lecture		lectures - 30 h	
The realization of activities		student's own work – 30 h	
classroom instruction		tutorial classes – 15 h	
Number of hours		TOTAL: 75 h – 3 ECTS	
Lecture: 30 hours			
The academic cycle			
2024/2025 summer semester			
Type of course		Language of instruction	
obligatory		English	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
- discussion		Final evaluation	
- multimedia-based lecture		Graded credit	
		Assessment methods	
		Lectures – written test in a form of a set of open questions	
		The basic criteria for evaluation	
		Assessment criteria in accordance with the University of Gdańsk Study Regulations	
		Lectures: passing the final test in a form of a set of open questions (a score of 50% or more required to pass the exam).	
Method of verifying required learning outcomes			
Written test (K_W05, K_W07, K_W08).			
Discussion with the students (K_U02, K_U04).			
Observation of the student's behavior during classes and during consultations. (K_K01).			
Required courses and introductory requirements			
A. Formal requirements			
none			
B. Prerequisites			
basic knowledge in chemistry and physics			
Aims of education			
Explaining the most important types and properties of various molecular anions.			
Teaching students about the role of molecular anions in chemistry.			
Course contents			
Electronic structure of molecular anions, most fundamental properties of molecular anions, classification of anions based on the potential responsible			

for an excess electron binding, various types of molecular anions: valence-bound anions, multipole-bound anions, metastable anions, multiply charged anions, cluster anions, double-Rydberg anions, solvated electrons. Modern theoretical methods used for studying molecular anions, the most recent discoveries concerning the subject.

The course will provide the knowledge about molecular anions in general and various types of negatively charged systems in particular. In addition, the proper selection of theoretical methods appropriate for studying certain types of anions will be explained. The course will also cover the problem of electronic, kinetic and thermodynamic stability of anions.

Bibliography of literature

Literature required to pass the course

An Introduction to Theoretical Chemistry, Jack Simons, Cambridge University Press, 2003

Extracurricular readings

Theoretical Prospects of Negative Ions, ed. J. Kalcher, Research Signpost, Trivandrum, 2002

The learning outcomes (for the field of study and specialization)

K_W05: has extended knowledge in the field of molecular anions

K_W07: selects suitable computational tools to the extent necessary to study various types of anions

K_W08: demonstrates in-depth knowledge of various anions and their role in chemistry

K_U02: critically assesses the results of performed theoretical calculations and discusses them in the context of predicted properties of molecular anions

K_U04: applies acquired knowledge of the electronic structure of molecular anions, general chemistry and related scientific disciplines

K_K01: knows the limitations of her/his own knowledge; understands the need for further education

Knowledge

Student defines and describes basic types of molecular anions and explains their stability by characterizing the most important interactions responsible for an excess electron binding.

Skills

Student has the ability of estimating the stability and lifetime of various molecular anions, develops the ability of choosing a proper quantum chemistry method to investigate the properties of a given anion, and the ability of interpreting the results of the performed theoretical calculations.

Social competence

Student develops the skills of accurate and logical thinking and inference. Learns the principles of working safely, responsibly, and efficiently. Develops the ability to work in a team.

Contact

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