KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY

Course title	ECTS code
Graduate study lecture - Molecular identification	13.3.0451

Name of unit administrating study

Faculty of Chemistry

Studies

faculty	field of study		
Wydział Chemii	Chemia	type	drugiego stopnia
		form	stacjonarne
		specialty	chemia biomedyczna, chemia i technologia środowiska, analityka i diagnostyka chemiczna, chemia obliczeniowa
		specialization	wszystkie

Teaching staff

dr Paweł Niedziałkowski

Forms of classes, the realization and number of hours

Forms of classes

Lecture

The realization of activities

classroom instruction

Number of hours

Lecture: 30 hours

ECTS credits

3
classes 30 h
tutorial classes 5 h
student's own work 40 h
TOTAL: 75 h - 3 ECTS

The academic cycle

2022/2023 summer semester

Type of course

obligatory

Language of instruction

polish

Teaching methods

multimedia-based lecture

Form and method of assessment and basic criteria for eveluation or examination requirements

Final evaluation

Graded credit

Assessment methods

Test pass with open questions

The basic criteria for evaluation

positive mark of the written exam consisting of open and closed questions covering the issues described in the lecture program

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements

analytical chemistry, inorganic chemistry, organic chemistry and physical chemistry

B. Prerequisites

knowledge of basic types of reactions occurring in organic and analytical chemistry, nomenclature and characteristics of organic and inorganic compounds

Aims of education

description to the types of interactions occurring in supramolecular chemistry.
introduction to the basic methods of synthesis and structures of supramolecular compounds.
presentation of the structure and nature of the interaction of natural and synthetic receptors participating in the process of molecular recognition
discussion of the latest achievements in the field of supramolecular chemistry underlying the molecular recognition process

Course contents

Description the basic covalent bonds and non-covalent interactions in the aspect of supramolecular chemistry. Discussion of the basic principles and

concepts occurring in supramolecular chemistry. Description of base structure and synthesis of supramolecular systems (molecular devices, molecular machines). Discussion of the latest developments and achievements and in the field of supramolecular chemistry. Phenomenological and molecular interpretation of energy and entropy occurring in the coordination and supramolecular systems. Effects: chelate, macrocyclic, template, preorganization and thermodynamic forces in the coordination and supramolecular chemistry. Self-organization, self-replication and supramolecular catalysis. Supramolecular polymers. Ionophores, chromoionophores and fluoronionophores. Types of organic compounds and functional groups used to the construction of molecular recognition systems. Construction and principles of function of molecular recognition sensors based on electrochemical and spectroscopic detection. Photochemical and photophysical methods of molecular interactions. Selected methods of modification of molecular surfaces with supramolecular systems and the possibility of their practical use.

Bibliography of literature

Literature required to pass the course

A.1. Literature used during classes:

1. Kompleksy typu gość-gospodarz, G. Schroeder, Betagraf,

2. Syntetyczne receptory jonowe, G. Schroeder, Betagraf,

3. Syntetyczne receptory molekularne, G. Schroeder, Betagraf,

4. Receptory Supramolekularne, G. Schroeder, Betagraf,

5. Wybrane aspekty chemii supramolekularnej, G. Schroeder, Betagraf,

6. Molecular Recognition: Biotechnology, Chemical Engineering and Materials Applications, Jason A. McEvoy, Nova Science Pub Inc.,

7. Supramolecular Chemistry - Fundamentals and Applications, Katsuhiko Ariga, Toyoki Kunitake, Springer,

8. Introduction to Supramolecular Chemistry, Helena Dodziuk, Springer,

9. Core concepts in Supramolecular Chemistry and Nanochemistry, Jonathan W. Steed,David R. Turner,Karl J. Wallace, John Wiley and Sons,

A.2. Literature for individual studies:

1. Supramolecular Chemistry, Jonathan W. Steed, J. L. Atwood, John Wiley and Sons,

2. Supramolecular Chemistry II - Host Design and Molecular Recognition, Edwin Weber, Springer,

B. Extracurricular readings

1. Chemosensors: Principles, Strategies, and Applications, Binghe Wang, Eric V. Anslyn, Willey,
2. Transition Metals in Supramolecular Chemistry,Jean-Pierre Sauvage, Wiley-Interscience,
3. Modern supramolecular chemistry: strategies for macrocycle synthesis, François Diederich,Peter J. Stang, Rik R. Tyk-winski, Weinheim : Wiley-VCH,
4. The Chemistry of Macrocyclic Ligand Complexes L. F. Lindoy, Cambridge University Press,

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

Knowledge

1. Defines and identifies the basic interactions occurring in the process of molecular recognition.
2. Classifies and describes the molecular and supramolecular systems occuring in solutions, solids and biological systems.
3. Describes the chemical structure and functioning of molecular devices.
4. Classifies and describe the structure of chemical compounds used for design of molecular recognition sensors based on chemical, electrochemical and spectroscopic detection.
5. Describes the surface modification methods for supramolecular chemistry purposes.

Skills

Posses the ability to critically evaluate the results of conducted experiments, observations and / or theoretical calculations

Social competence

1. Can independently search for information in the chemical literature.
2. Formulates opinions in the fields of the use of supramolecular compounds in medicine and modern technologies.
3. Recognizes the sensors used in everyday life.

Contact

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