KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego

UNIA EUROPEJSKA
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FUNDUSZ SPOŁECZNY

Course title	ECTS code
Graduate study lecture - Physicochemical properties of aminoacids and their derivatives	13.3.0413

Name of unit administrating study

null

Studies

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

Teaching staff

dr hab. Jarosław Ruczyński

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 10 h
student's own work 35 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

(mid-term / end-term) test

The basic criteria for evaluation

positive evaluation of the written exam consisting of 6-10 open questions covering issues mentioned in the subject curriculum contents; answers to the questions will require solving tasks related to the assumed effects of education; the grading scale will be adjusted to the rating range of the assessed written work
negative grade should be improved

Method of verifying required learning outcomes

Required courses and introductory requirements

A. Formal requirements
completed courses inn organic chemistry and biochemistry

B. Prerequisites
basic knowledge of organic chemistry and biochemistry

Aims of education

The aim of the course is to familiarize students with:
the issues set out in the program content of the lecture
the chemical structure and occurrence and significance of amino acids in the Nature
the essential physicochemical properties of amino acids, methods of their synthesis and analytical techniques used in identification and qualitative

and quantitative analysis of amino acids
On completion of the course the student shall be able to evaluate critically of the information about the importance of amino acids in the Nature and the effect of amino acids on human health

Course contents

Chemical structure, nomenclature and classification of amino acids. The occurrence and significance of amino acids found in the Nature. Stereochemistry of amino acids (relative and absolute configuration, optical activity). Physiological properties of amino acids (toxicity and metabolism).
Physicochemical properties of amino acids (smell, taste, physical state, solubility, melting point, acidic/basic properties, optical and spectroscopic properties). Typical and specific chemical reactions of amino acids. The method for obtaining of
amino acids (prebiotic synthesis, biosynthesis, extracting of amino acids from the protein hydrolysates, microbiological, enzymatic and synthetic methods – typical, specific and chiral).
Methods of separation of racemic mixtures of amino acid into enantiomers. The methods of separation (chromatographic and electrophoretic) and analysis (mass spectrometry, sequencing) of amino acids. The use of amino acids in industry (food, pharmaceutical, cosmetic and chemical industries). Unnatural (synthetic) amino acids – properties, preparation and application

Bibliography of literature

Literature required to pass the course
Jakubke HD, Jeschkeit H – „Aminokwasy, peptydy, białka”
Kołodziejczyk A – „Naturalne związki organiczne”
C. Barret – „Chemistry and biochemistry of amino acids”
Ahluwalia VK, Kumar LS, Kumar S – „Chemistry of natural products: amino acids, peptides, proteins and enzymes”
monographic papers provided by the lecturer
Extracurricular readings
various handbooks concerning chemistry and biology of amino acids

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

Knowledge

defines and presents the chemical structure of amino acids and their derivatives
knows how to name amino acids and their derivatives, explains their importance for the functioning of living organisms
characterizes the basic physical and physiological properties of amino acids
describes and illustrates by means of chemical reactions the basic chemical properties of amino acids and methods for their preparation
characterizes the basic techniques used in the identification and quantitative analysis of amino acids
knows the application of amino acids in the food, pharmaceutical, cosmetic and chemical industries

Skills

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

Social competence

understands the need for continuous education,
is aware of the need for a critical analysis of his own work
shows cautious criticism in receiving information (particularly available in the mass media) regarding the impact of amino acids and their derivatives on the functioning of living organisms and their application in the pharmaceutical, food and cosmetics industries

Contact

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