UNIWERSYTET GDAŃSKI

Course title
Wykład specjalizacyjny - Właściwości fizykochemiczne aminokwasów i ich pochodnych / Graduate study lecture - Physicochemical properties of aminoacids and their derivatives

ECTS code
13.3.0413

Name of unit administrating study
Faculty of Chemistry

Studies

Field of study	Type	Form	
Chemistry	Master	Full-time studies	

Teaching staff
Jarosław Ruczyński, PhD, DSc

Forms of classes, the realization and number of hours

A. Forms of classes, in accordance with the UG Rector's regulations
Lecture

B. The realization of activities
In-class learning

Number of hours 30

ECTS credits 3
classes 30 h
tutorial classes 10 h
student's own work 35 h
TOTAL: 75 h - 3 ECTS

The academic cycle
First year, summer semester

Type of course
obligatory

Language of instruction
Polish

Teaching methods
Lecture with multimedia presentation

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

A. Final evaluation, in accordance with the UG study regulations
Course completion (with a grade)

B. Assessment methods
Written exam with 6-10 open questions

C. The basic criteria for evaluation or exam requirements
- 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

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

A. 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

B. Extracurricular readings

- various handbooks concerning chemistry and biology of amino acids

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