University of Gdańsk

Subject card

Subject name and code	Graduate study lecture - Physicochemical properties of aminoacids and their derivatives, PG_00040382		
Field of study	Chemistry		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	1	Language of instruction	Polish
Semester of study	2	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. Jarosław Ruczyński	
	Teachers	dr hab. Jarosław Ruczyński	

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

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 andthe effect of amino acids on human health

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	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	[SW4] test/exam - oral or written
[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 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	[SK1] oral statement/conversation/ discussion
[CHEMMU2_U02] Critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors.	Has the ability to critically evaluate the results of conducted experiments, observations and/or theoretical calculations.	[SU1] oral statement/conversation/ discussion

Subject 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 ofamino 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

Prerequisites and co-requisites

completed courses inn organic chemistry and biochemistry

basic knowledge of organic chemistry and biochemistry

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Graded credit - test	50.0%	100.0%

Recommended reading

Basic literature	Jakubke HD, Jeschkeit H "Aminokwasy, peptydy, białka", W-wa 1989 Kołodziejczyk A "Naturalne związki organiczne", W-wa PWN 2018 C. Barret "Chemistry and biochemistry of amino acids" Ahluwalia VK, Kumar LS, Kumar S "Chemistry of natural products: amino acids, peptides, proteins and enzymes"
Supplementary literature	various handbooks concerning chemistry and biology of amino acids
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Give the chemical name for the amino acids with the structure shown in the figure.2. Determine the relative and absolute configuration of the amino acids shown in the figure.3. Using any method of amino acid synthesis, present the method of obtaining leucine.4. What products (draw the structure and give the name of these products) will be formed as a result of the reaction of phenylalanine with *t*-butyl dicarbonate in an alkaline medium.
Work placement	Not applicable

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