

Subject card

Subject name and code	Graduate study lecture - Physicochemical properties of aminoacids and their derivatives, PG_00040382						
Field of study	Wykład specjalizacyjny - Właściwości fizykochemiczne aminokwasów i ich pochodnych (Wykład)						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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_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] wypowiedź ustna/rozmowa/diskusja
	[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] wypowiedź ustna/rozmowa/diskusja
	[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/egzamin - ustny lub pisemny
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 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		
Prerequisites and co-requisites	completed courses in 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 <i>t</i>-butyl dicarbonate in an alkaline medium.
Work placement	Not applicable

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