

Subject card

Subject name and code	Nature chemistry, PG_00080729						
Field of study	Chemical Business						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	Bachelor's studies	Subject group			Optional subject group		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			2.0		
Learning profile	academic	Assessment form			credit		
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Piotr Storoniak				
	Teachers		dr hab. Piotr Storoniak				
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		15.0	50
Subject objectives	<p>- familiarizing students with selected substances occurring in the human body and the natural environment in terms of their structure, occurrence, methods of obtaining and physiological role;</p> <p>- familiarize students with facts regarding the functioning of living organisms at the level of chemical changes;</p> <p>- acquiring the ability to understand the benefits and threats of chemical substances of natural origin;</p> <p>- introducing students to the possibilities offered by interdisciplinary knowledge combining chemistry, biology and medicine.</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BCHINŽ_K01] Identifies the level of her/his own knowledge and skills as well as the need to update engineering knowledge, continuous professional training and personal development.	- understands the need for lifelong learning; - understands the need to improve professional and personal competences	[SK4] test/exam - oral or written
	[BCHINŽ_U09] Using the acquired knowledge, skills and various sources of scientific information independently prepares written papers and oral presentations.	- has the ability to critically analyze information contained in popular science sources and popular opinions regarding chemical substances.	[SU4] test/exam - oral or written
	[BCHINŽ_U08] Uses the chemical nomenclature and engineering terminology properly.	- the student presents extended knowledge in the field of organic chemistry, regarding the structure of properties and the origin of natural compounds; - understands and is able to explain the regularities and processes occurring in the human body at the molecular level; - is familiar with current directions and the latest discoveries in the field of natural sciences related to living matter.	[SU4] test/exam - oral or written
[BCHINŽ_W02] Enumerates basic laws and theories in chemistry, physics and mathematics necessary to formulate and solve simple engineering tasks.	- speaks with understanding about chemical issues; - applies acquired chemical knowledge to analyze practical problems related to chemical substances present in nature;	[SW4] test/exam - oral or written	
Subject contents	<p>- amino acids - physicochemical properties and physiology, exogenous amino acids, amino acids in nutritional terms, toxic properties of amino acids, metabolism, natural non-protein amino acids (neurotoxins of plants and cyanobacteria, marine biotoxins of diatoms and algae, thyroid hormones), commercial importance of amino acids (including monoglutamate sodium).</p> <p>- selected biologically active peptides: glutathione, as an element of the antioxidant system of cells, hypothalamic hormones (thyrotropin and thyrotropin), pituitary hormones (adrenocorticotropin, melanotropin, somatotropin, oxytocin and vasopressin), pancreatic peptides (insulin, glucagon), opioid peptides (enkephalins, endorphins). as endogenous morphines, -casomorphins, dermorphins)</p> <p>- peptide antibiotics history and present, structure and mechanism of action</p> <p>- peptide toxins - venoms of mushrooms, snakes, stinging insects and spiders - mechanisms of action</p> <p>- use of peptides in cosmetics, botulinum toxin</p> <p>- simple proteins - albumins and globulins as plasma components, tuberin - potato albumins and globulins, fibrinogen, keratin as a representative of fibrillar proteins, use of waste containing keratin, keratin in medicine and tissue engineering, cytoskeletal proteins, connective tissue proteins, collagen - the most abundant protein in our body, aging processes, the use of collagen in cosmetology and aesthetic medicine, elastin - vascular aging</p> <p>- complex proteins - glycoproteins (cell membrane proteins), chromoproteins (hemoglobins - biological, physiological and physicochemical aspects)</p> <p>- alkaloids as substances biosynthesized from amino acids, classification, physiological role, examples of alkaloids and their biological activity, plant and animal alkaloids, capsaicin - biological, physiological and commercial aspects, ephedrine, psychotropic substances, psychoactive substances</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		50.0%	100.0%
Recommended reading	Basic literature	An Introduction to Medicinal Chemistry, Seventh Edition, Graham L. Patrick, Oxford University Press 2023	
	Supplementary literature	Molecular Toxicology, Second Edition, P. David Josephy, Bengt Mannervik, Oxford University Press 2006	
	eResources addresses		

Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • Tyrosine in metabolic processes • Amnesic biotoxins - amnesic mollusc poisoning • Commercial uses of amino acids • Toxicity of the fly agaric mushroom Amanita phalloides • -bungarotoxin as a postsynaptic neurotoxin • Methods of obtaining water-soluble keratin from natural raw materials • Desmosine as the basic cross-linking element of elastin chains • Phenylethylamine physiological effect and its psychoactive derivatives • Mechanism of action of amphetamine (AMPH) and methamphetamine (METH)
Work placement	Not applicable

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