

Subject card

Subject name and code	Monographic lecture - Synthesis methods and biochemical properties of proteins and glycoproteins, PG_00082460						
Field of study	Chemical Business						
Date of commencement of studies	February 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		prof. dr hab. Adam Prahł				
	Teachers						
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		20.0		25.0	75
Subject objectives	Introducing students to basic issues regarding the synthesis of peptides and glycopeptides. To familiarize students with the basic properties of glycopeptide peptides. Introducing students to the basics of methods used in the synthesis of glycopeptide peptides. Introducing students to methods for characterizing and analyzing peptides and glycopeptides. Developing the ability to solve problems that may arise during experiments. Developing the ability to draw conclusions from experiments and their results in order to plan subsequent tasks.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BCHMU2_W05] Knows and understands the main trends in the development of chemistry combined with economics as two interpenetrating scientific disciplines.	Knows and understands the possibilities of using peptide compounds as biologically active compounds. Knows basic databases regarding peptides. Knows modern methods of peptide synthesis. Understands the impact of various types of modifications on the properties of compounds peptide nature (commercialization).	[SW4] test/exam - oral or written
	[BCHMU2_U01] Is able to, on the basis of her/his knowledge, propose a solution to problems in chemistry, taking into account the economic aspect by using advanced measurement techniques.	Is able to independently search for available materials, absorb their content and then use the acquired information. Is able to independently plan a chemical experiment.	[SU5] implementation of a problem task
	[BCHMU2_W01] Knows and understands complex physicochemical processes and is able to analyse their course in connection with other fields of science.	Knows the basic physicochemical processes occurring in organisms. Knows and understands the role of proteins and glycoproteins in organisms.	[SW4] test/exam - oral or written
	[BCHMU2_U02] Is able to define her/his interests, develop them within the chosen direction and in connection with the subject of her/his master's thesis by implementing the process of self-education and planning her/his professional career.	Takes a specific position on basic chemical and biochemical issues. Demonstrates activity in using acquired knowledge and skills in everyday life.	[SU8] observation of student's independent or team work
	[BCHMU2_K04] Is willing to properly assess the acquired knowledge, respect and disseminate it in order to solve specific cognitive and practical issues.	Understands the need for further education. Follows established procedures in laboratory work. daytime; Demonstrates creativity in performing independent and group tasks.	[SK8] observation of student's independent or team work
Subject contents	Protein and non-protein amino acids - their nomenclature, classification and physicochemical properties (solubility, melting point, acid-base properties, spectroscopic properties). Shields of functional groups and side chain groups (methods of introduction and removal, orthogonality of shields). Methods of creating a peptide bond - reagents used to couple amino acid residues. Tactics and strategy of peptide synthesis. Peptide synthesis planning the use of automation and technical innovations. Peptide synthesis in solution and on a solid support. Problems related to peptide synthesis (side reactions, racemization) and methods of preventing them. Synthesis of unusual amino acids, fragments imitating peptide bonds and introduction of fragments limiting conformational freedom into peptide molecules. Review and discussion of the biochemical properties of selected natural polypeptides and glycoproteins. the role and functions of peptides, proteins and glycoproteins in the body. The use of structural X-ray imaging to determine the structures of macromolecules. The use of capillary electrophoresis to analyze and identify chemical compounds, especially peptides.		
Prerequisites and co-requisites	Passed subjects: Organic Chemistry and Biochemistry.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam.	50.0%	100.0%
Recommended reading	Basic literature	<p>H.D. Jakubke, H. Jeschkeit, Amino acids, peptides, proteins, PWN, Warsaw 1989</p> <p>J. Jones, Amino Acid and Peptide Synthesis, Oxford University Press, Oxford, England 2002</p> <p>S. Doonan, Proteins and peptides, PWN, Warsaw 2008</p> <p>N. Sewald and H.D. Jakubke, Peptides: Chemistry and Biology, Wiley-VCH Verlag GmbH & Co. KGaA 2002</p> <p>J.P. Landers, Handbook of capillary and microchip electrophoresis and associated microtechniques, CRC Press 2008</p>	
	Supplementary literature	No requirements.	

	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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