

Subject card

Subject name and code	Monographic lecture - Synthesis methods and biochemical properties of proteins and glycoproteins, PG_00050887						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
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	2		Language of instruction		Polish		
Semester of study	3		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		5.0		40.0	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
	[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	Takes a specific position on basic chemical and biochemical issues. Knows how to use the acquired knowledge and skills in life everyday.	[SW4] test/exam - oral or written
	[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.	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.	[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 to improve qualifications and skills using various sources.	[SK8] observation of student's independent or team work
	[CHEMMU2_W01] Uses knowledge of spectroscopic methods of chemical compound analysis.	Recognizes and distinguishes techniques of identification, separation and analysis of biomolecules. Has knowledge of automation of synthesis and identification processes peptides and glycopeptides.	[SW4] test/exam - oral or written
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	H.D. Jakubke, H. Jeschkeit, Amino acids, peptides, proteins, PWN, Warsaw 1989 J. Jones, Amino Acid and Peptide Synthesis, Oxford University Press, Oxford, England 2002 S. Doonan, Proteins and peptides, PWN, Warsaw 2008 N. Sewald and H.D. Jakubke, Peptides: Chemistry and Biology, Wiley-VCH Verlag GmbH & Co. KGaA 2002 J.P. Landers, Handbook of capillary and microchip electrophoresis and associated microtechniques, CRC Press 2008	
	Supplementary literature	No requirements.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		

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