


KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
Unię Europejską w ramach
Europejskiego Funduszu
Społecznego

UNIA EUROPEJSKA
EUROPEJSKI
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Course title		ECTS code	
Monographic lecture - Synthesis methods and biochemical properties of proteins and glycoproteins		13.3.0444	
Name of unit administrating study			
null			
Studies			
faculty	field of study	type	drugiego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	wszystkie
		specialization	wszystkie
Teaching staff			
prof. dr hab. Adam Prahl			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Lecture		30 h classes	
The realization of activities		10 h consultation	
classroom instruction		35 h student's own work	
Number of hours		TOTAL: 75 h - 3 ECTS	
Lecture: 30 hours			
The academic cycle			
2023/2024 winter semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
multimedia-based lecture		Final evaluation	
		Graded credit	
		Assessment methods	
		- written exam with open questions	
		- oral exam	
		The basic criteria for evaluation	
		positive evaluation of the written exam, consisting of 8-10 open questions covering issues mentioned in the lecture's program	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
completed subject „Organic chemistry”			
completed subject „Biochemistry”			
B. Prerequisites			
completed subject „Organic chemistry”			
Aims of education			
1. introducing students to basic issues related to the synthesis of peptides and glycopeptides;			
2. making students familiar with the basic peptides and glycopeptides properties;			
3. introducing students to basics methods used to obtain peptides and glycopeptides;			
4. introducing students to methods used to characterize and analyze peptides and glycopeptides;			
5. developing of self-experimentation skills;			

6. developing skills to solve problems while conducting chemical experiments; 7. developing skills to draw conclusions from the experiments (their results) in order to plan the next tasks.	
Course contents Coded and non-coded amino acids - their terminology, classification and physicochemical properties (solubility, melting point, acid-base properties, spectroscopic properties). Functional moiety and side chain protecting groups (introduction and removal methods, protecting groups orthogonality). Peptide bond formation - reagents used to conjugate amino acid residues. Peptide synthesis tactic and strategy. The use of automation and technical innovations when planning peptide synthesis. Peptide synthesis in solution and on a solid support. Problems related to peptide synthesis (side reactions, racemization) and methods of their prevention. Synthesis of non-typical amino acids, peptide bond imitating fragments, and introducing into peptide molecules fragments limiting conformational freedom. Review and discussion of biochemical properties of selected polypeptides and natural glycoproteins. Role and functions of peptides, proteins and glycoproteins in organisms. The use of structural x-ray crystallography to determine the structure of macromolecules. The use of capillary electrophoresis to analyze and identify chemical compounds (in particular of a peptide nature).	
Bibliography of literature Literature required to pass the course H.D. Jakubke, H. Jeschkeit, Aminokwasy, peptydy, białka, PWN, Warszawa 1989 J. Jones, Amino Acid and Peptide Synthesis, Oxford University Press, Oxford, England 2002 S. Doonan, Białka i peptydy, PWN, Warszawa 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	
The learning outcomes (for the field of study and specialization)	Knowledge <ol style="list-style-type: none"> 1. knows and understands the possibilities of using peptides as biologically active compounds; 2. correctly uses the peptide chemistry terminology; 3. knows basic peptide databases; 4. recognizes and distinguishes monomers used in the peptides and glycopeptides synthesis; 5. knows methods for main and side functions protection used in peptide synthesis; 6. knows and explains main differences in the properties of protected and unprotected amino acids; 7. knows methods in peptide synthesis; 8. understands the impact of various modification on the peptide compounds properties; 9. knows and explains basic problems in peptide synthesis; 10. recognizes and distinguishes different techniques for biomolecules identification, separation and analyze; 11. has knowledge about the automation in peptides and glycopeptides synthesis.
	Skills
	Social competence <ol style="list-style-type: none"> 1. understands the need for further education; 2. follows established procedures in laboratory work; 3. expresses specific views on basic chemical and biochemical issues; 4. is active in the use of acquired knowledge and skills in everyday life; 5. demonstrates creativity in performing individual and group tasks; 6. is careful in dealing with hazardous chemicals.
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