University of Gdańsk

Subject card

Subject name and code	Physicochemical methods of peptide analysis, PG_00179578		
Field of study	Chemical Business, Chemistry		
Date of commencement of studies	February 2027	Academic year of realisation of subject	2027/2028
Education level	Master'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	3	ECTS credits	1.0
Learning profile	academic	Assessment form	credit
Conducting unit	Laboratory of Bioorganic Chemistry -> Department of Molecular Biochemistry -> Faculty of Chemistry -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Agata Gitlin-Domagalska	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	18.0	0.0	0.0	18
	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	18	3.0	4.0	25

Subject objectives	Understanding the structure, chemical, and physical properties of peptides. Acquiring knowledge and understanding of selected analytical methods used for the identification, characterization, and analysis of peptides. Developing skills in interpreting experimental data and analyzing results obtained from various instrumental techniques.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BCHMU2_K03] Is willing to critically assess the level of her/ his knowledge in the light of the achievements of the scientific discipline studied.	The student is able to critically analyze results obtained using instrumental techniques (e.g., mass spectrometry, HPLC), assess the correctness of the analysis, and verify its compliance with the generally accepted principles of the given analytical method. The student is aware of the limitations of the applied research methods and is able to identify possible sources of error and suggest ways to minimize them	[SK3] text preparation/written work
[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.	The student is able to identify and develop their scientific interests in the field of peptide analysis, using acquired knowledge and skills to independently enhance their competencies and to plan their research and professional path, including the master thesis.	[SU1] oral statement/conversation/ discussion [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.	The student is able to critically evaluate and apply acquired knowledge to solve research and practical problems, with respect for the principles of scientific integrity and a readiness to share knowledge within academic and professional environments.	[SK1] oral statement/conversation/ discussion [SK2] presentation/project/paper/ report
[BCHMU2_W01] Knows and understands complex physicochemical processes and is able to analyse their course in connection with other fields of science.	The student understands peptide analysis techniques and is able to analyze their course using knowledge from chemistry, biology, and physics. The student knows the characteristic reactions of selected amino acids.	[SW2] presentation/project/paper/ report [SW3] text preparation/written work [SW5] implementation of a problem task
[BCHMU2_U04] Is able to independently plan and perform specific research tasks in the field or in the laboratory, interpret their results working individually or in a team, assuming various roles and functions including managerial.	The student is able to independently plan and conduct peptide analysis using selected physicochemical methods (e.g., HPLC, mass spectrometry, characteristic reactions of functional groups), interpret the obtained results, and collaborate effectively within a laboratory team.	[SU5] implementation of a problem task [SU6] demonstration of practical skills
[BCHMU2_W04] Knows and understands specialist IT tools used in chemical diagnostics.	The student knows and is able to apply specialized IT tools (e.g., HPLC software) used in the chemical analysis of peptides.	[SW3] text preparation/written work [SW5] implementation of a problem task

Subject contents

Three laboratory exercises covering:
Characteristic reactions of amino acids and peptides;
Hydrolysis of a peptide/protein;
Acid hydrolysis of a peptide and physicochemical analysis (HPLC, TLC, MS);

Prerequisites and co-requisites

Structure of amino acids, peptides, and proteins. Knowledge of organic chemistry and biochemistry.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final report on the completed laboratory exercises, including an analysis of the obtained results based on the knowledge acquired during the lecture, presented in the form of an oral presentation. The evaluation will focus on the correctness of the formulated conclusions, as well as the analysis and interpretation of the results.	51.0%	100.0%

Recommended reading	Basic literature	Stryer L., Berg J.M., Tymoczko J.L., Gatto G.J. Biochemia, Wydawnictwo Naukowe PWN, 2018 Sewald N., Jakubke H.-D. Peptides: Chemistry and Biology, Wiley-VCH, 2009 Cox M.M., Nelson D.L., Krótkie wykłady z biochemii, Wydawnictwo Naukowe PWN, 2019
	Supplementary literature	Domagała S. Spektrometria mas w analizie chemicznej i biologicznej, Wydawnictwo Naukowe UAM, 2012. Barrett G.C., Elmore D.T. Amino Acids and Peptides, Cambridge University Press, 1998. Silverstein R.M., Webster F.X., Kiemle D.J. Spektroskopowe metody identyfikacji związków organicznych, Wydawnictwo Naukowe PWN, 2008
	eResources addresses	
Example issues/ example questions/ tasks being completed	Structure and physicochemical properties of amino acids and peptides; Mechanisms of peptide hydrolysis (acidic, basic, enzymatic); Principles of operation and applications of techniques: HPLC, TLC, mass spectrometry; Interpretation of MS spectra and HPLC chromatograms; Characteristic reactions of functional groups in amino acids and peptides;	
Work placement	Not applicable	

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