University of Gdańsk

Subject card

Subject name and code	Synthesis of biologically active compounds, PG_00117756						
Field of study	Chemistry						
Date of commencement of studies	October 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 Subject group related to scientific research in the field of study		
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		8.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Piotr Rekowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	90.0	0.0	0.0	90
	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	90		15.0		95.0	200
Subject objectives	1. Chemical synthesis of the tripeptide using the solid-support method (Merrifield method) 2. Synthesis of glycoamino acid conjugates 3. Synthesis of racemic amino acid derivatives in solution; separation of racemic amino acids						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_K02] Is able to undertake a variety of roles in the team, including supervisory ones.	1. Appreciates the need for teamwork skills through discussion and consultation 2. Is aware of the need for critical analysis of own work, shows creativity in the search for alternative solutions	[SK5] implementation of a problem task
[CHEMMU2_W10] Uses knowledge of the principles of operation of the basic scientific and research apparatus used in chemistry.	4. Illustrates the principles of solid-peptide synthesis 6. Lists ways to activate the anomeric carbon atom 7. Lists the effects of the anomeric effect in mono-, oligo- and polysaccharides	[SW5] implementation of a problem task
[CHEMMU2_K04] Correctly identifies and resolves dilemmas related to the profession of a chemist.	3. Demonstrates responsibility in laboratory work (including for work tools entrusted to him, generally available apparatus and laboratory equipment) 4. Appreciates the need to continually expand knowledge and practical skills 5. Be careful when handling chemicals	[SK5] implementation of a problem task
[CHEMMU2_U02] Critically assesses the results of conducted, performed observations and theoretical calculations and discusses errors.	2. Designs peptide synthesis in a schematic form 4. Proposes methods for determining the structure of the sugar part in glycopeptide and glycoamino acid 8. Separates the racemic mixture of amino acids	[SU6] demonstration of practical skills
[CHEMMU2_W04] Applies the acquired knowledge to an in-depth description of the properties of chemical connections, methods of their synthesis and analysis.	3. Characterizes methods of peptide bond formation 8. Lists ways of forming O- and N-glycosidic bond with amino acids	[SW5] implementation of a problem task

Subject contents

Part I. Peptide synthesis: chemical synthesis of tripeptide on solid support with Fmoc / But tactics using trityl resin, chromatographic analysis of tripeptide after synthesis (HPLC), mass spectrum analysis (MS-MALDI-TOF).

Part II Synthesis of glycoamino acid conjugates: synthesis of 2-acetamido-3,4,6-tri-O-acetyl-2-deoxy--D-glucopyranosyl chloride sugar substrate; sugar derivative coupling reaction with N-9-fluorenylmethoxycarbonyl-L-serine benzyl ester, chromatographic analysis obtained after synthesis of glycoamino acid conjugate (TLC)

Part III Asymmetric organic synthesis: solution synthesis in racemic amino acid derivatives; separation of racemic amino acids using enzymes (chymotrypsin, papain); separation of racemic amino acids using diastereomeric salts, determination of the degree of optical purity of separated compounds by the polarimetric method

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
activity and involvement in classes	0.0%	20.0%
- written exam with open questions graded course credit based on individual grades obtained during the semester	51.0%	40.0%
a written report on the exercise performed	51.0%	40.0%

Recommended reading

Basic literature	-Shwan Doonan, Peptydy i białka PWN, Warszawa 2007. -H.-D. Jakubke , H. Jeschkeit, Aminokwasy, peptydy, białka, PWN , Warszawa, 1989. - A. Kołodziejczyk Naturalne związki organiczne, PWN, 2003.Podstawy Chemii Węglowodanów, Świderski J., Strusiński J., Temeriusz A., 1973. - Podstawy Chemii Cukrów, Wiśniewski A., Madaj, J., 1997. Współczesna synteza organiczna, J. Gawroński, Wydawnictwo naukowe PWN
Supplementary literature	Monographic materials prepared by the lecturers
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Chemical synthesis of the tripeptide using the solid-support method (Merrifield method) 2. Synthesis of glycoamino acid conjugates 3. Synthesis of racemic amino acid derivatives in solution; separation of racemic amino acids
Work placement	Not applicable

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