University of Gdańsk

Subject card

Subject name and code	Diploma lecture - Chemistry and biochemistry of selected biomolecules, PG_00081847		
Field of study	Chemistry		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	Bachelor'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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	2.0
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	prof. dr hab. Krzysztof Rolka	
	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	15.0	50

Subject objectives

Familiarizing students with all issues mentioned in the lecture program content, familiarizing students with the basic groups of biomolecules; ltheir structures and functions, familiarizing students with the basic methods of bioanalytical chemistry used for the identification and quantitative and qualitative analysis of organic compounds occurring in living organisms, familiarizing students with experimental methods used during the completion of their diploma work.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_U08] Presents in an understandable way the basic facts about chemistry using a scientific language typical of chemical sciences.	Uses chemical, biochemical and medical terminology necessary for the presentation (in written and oral form) of program content lecture. Uses scientific literature to prepare studies corresponding to the course content.	[SU4] test/exam - oral or written
[CHEML3_K01] Identifies the level of her/his own knowledge and skills and the need for continuous learning and personal development.	Understands the need for continuous education, Demonstrates cautious criticism in accepting information, especially available in the mass media. Is aware of the need to work honestly and diligently.	[SK4] test/exam - oral or written
[CHEML3_W03] Explains the relationship between the structure of matter and its observed properties.	Characterizes the interactions between biomacromolecules.	[SW4] test/exam - oral or written
[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	Defines and presents the chemical structure of bio- and macromolecules, explains their biological significance Characterizes the basic methods of analysis of endogenous organic compounds and their derivatives Characterizes the basic methods of synthesis of peptides and peptidomimetics.	[SW4] test/exam - oral or written

Subject contents

Basic methods of analyzing biomolecules - liquid chromatography (basics of liquid chromatography - molecular filtration, adsorption chromatography, reverse phase separation, ion exchange chromatography, affinity chromatography). Thin layer chromatography. Gel electrophoresis. Capillary electrophoresis. Mass spectrometry Sequence analysis: nucleic acids, peptides and proteins. Mechanism of action and examples of hormones and neurotransmitters. The structure of cell walls. Antibiotics mechanism of action. Arachidonic acid and its metabolites. Basics of chemical synthesis: peptides, peptidomimetics and nucleic acids. Chemical structure and biological functions of peptides, proteins, nucleic acids and polysaccharides.

Prerequisites and co-requisites

Basic knowledge of organic chemistry, biochemistry, including the chemical structures of biopolymers, knowledge of basic techniques and laboratory equipment used in the analysis of organic compounds.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Positive grade in a written exam consisting of 6 open questions covering the issues mentioned in the lecture program content;	51.0%	100.0%

Recommended reading

Basic literature	J. M. Berg, J. L. Tymoczko, L. Stryer, Biochemia, PWN, Warszawa 2009.
Supplementary literature	Monographic and review publications provided by lecturers and independently selected by students.
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Give examples and discuss the mechanism of action of antibiotics that inhibit the synthesis of bacterial cell walls.2. Give and briefly describe the hormones of the anterior pituitary and hypothalamus.3. Demonstrate the involvement of arachidonic acid in the induction of pathological conditions.4. Present the structures and characterize chitin and chitosan.5. Discuss what DNA sequencing using the dideoxy method (Sanger method).6. a) State the advantages and disadvantages of capillary electrophoresis. b) What conditions must be met to enable simultaneous analysis of anions, cations and neutral molecules in capillary electrophoresis.

Work placement

Not applicable

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