University of Gdańsk

Subject card

Subject name and code	Biochemistry, PG_00103518		
Field of study	Environmental Protection		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	undergraduate studies	Subject group	Obligatory subject group in the field of study
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish Polish
Semester of study	5	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Pracownia Chemii Bioorganicznej -> Katedra Biochemii Molekularnej -> Faculty of Chemistry		
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	15.0	0.0	0.0	0.0	0.0	15
	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	15	2.0	33.0	50

Subject objectives	
	To acquaint students with all issues mentioned in the lecture contents.To introduce students to the basic endogenous organic compounds, their structure and functions.To acquaint students with selected metabolic pathways and relations between them.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[OŚL3_U11] Uses statistical methods as well as algorithms and IT techniques, including application software packages to describe environmental experiments and analysis of typical data in socio-economic activities based on science and natural sciences.	Uses chemical terminology to the extent necessary to present (in written and oral form) the course content. Predicts the physicochemical and biological properties of organic compounds based on their chemical formulas.	[SU4] test/exam - oral or written
[OŚL3_U02] Plans, selects appropriate research and measuring equipment and devices, performs physicochemical measurements and experiments; analyses the results and draws conclusions based on them.	Designs and performs simple biochemical experiments, selecting laboratory equipment according to its purpose. Analyzes and interprets the results of experiments and draws conclusions regarding the correctness of their course.	[SU4] test/exam - oral or written
[OŚL3_K08] Is responsible for and takes care of the specialist equipment entrusted to her/him for research and laboratory or field work.	Is aware of the need to critically analyze one's own work. Demonstrates cautious criticism in accepting information, especially available in the mass media. Is aware of honest and reliable work.	[SK4] test/exam - oral or written
[OŚL3_W01] Discusses the basic concepts of mathematics, physics, chemistry and biology. Describes physical, chemical and biological phenomena occurring in nature as well as geological, geomorphological and climatic conditions of the functioning of nature.	Defines and demonstrates chemical structure of basic groups of bio- and macromolecules. Describes and illustrates selected metabolic pathways using chemical reactions, explains their importance for the body functioning.	[SW4] test/exam - oral or written
[OŚL3_K05] Identifies the level of her/his knowledge and skills, demonstrates the need to update knowledge about the environment and its protection, demonstrates the need for continuous professional training and personal development.	Understands the need for continuous education.	[SK4] test/exam - oral or written
[OŚL3_U07] Uses basic laboratory techniques, conducts field research and performs qualitative and quantitative analyses and draws conclusions on this basis for practical purposes.	Uses basic analytical techniques used in analysis endogenous organic compounds.	[SU4] test/exam - oral or written

Subject contents

Energy-rich compounds, thermodynamics of biochemical reactions. Classification, structures and functionsof enzymes. Mechanisms of enzyme catalysis. Carbohydrates, lipids and proteins structures and functions.Biological membranes structure and functions. Metabolic pathways: glycolysis, gluconeo-genesis, pyruvatedecarboxylation, Krebs cycle, oxidative phosphorylation, glycogen metabolism, fatty acids metabolism, amino acids metabolism, Proteins G and signal transduction. Photosynthesis. DNA and RNA: replication, transcription, translation.

Prerequisites and co-requisites

organic chemistry

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam - 5 open questions covering the content of the lecture and laboratory classes; duration 90 min	51.0%	100.0%

Recommended reading	Basic literature	J. M. Berg, J. L. Tymoczko, L. Stryer, Biochemia, PWN, Warszawa 2009 and and subsequent editions
	Supplementary literature	Other academic textbooks for biochemistry
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Define gycolysis and explain its role in the generation of metabolic energy. If the C-1 carbon of glucosewere labeled with 14C, which of the carbon atoms in pyruvate would be labeled after gycolysis? Answershould be explain with chemical reactions2. Describe the mechanism of the DNA replication3. Outline the catalytic mechanism of serine proteinases and possible mechanisms of their inhibition.4. Outline metabolic pathways of L-alanine5. Aqueous solution contains 5 proteins, among them one is trypsin inhibitor and one is chymotrypsininhibitor. Propose experiment that would allow to isolate and identify them in pure from.	
Work placement	Not applicable	

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