University of Gdańsk

Subject card

Subject name and code	Biochemistry, PG_00080716		
Field of study	Chemical Business		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	Bachelor's 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	2	Language of instruction	Polish Polish
Semester of study	4	ECTS credits	2.0
Learning profile	academic	Assessment form	exam
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	prof. dr hab. Krzysztof Rolka	

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	
	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 basic metabolic pathways and relations between them

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BCHINŻ_W07] Describes the construction and operating principles of basic scientific, technological and control-measuring apparatus.	Defines and demonstrates chemical structure of basic groups of bio- and macromolecules. Describes and illustrates main metabolic pathways using chemical reactions, explains their importance for the body functioning. Characterizes basic analytical methods of endogenous, organic compounds. Characterizes methods of determination of enzymatic activity of selected proteases. Recognizes basic laboratory equipment. Understands influence of diet on physical condition of the body.	[SW4] test/exam - oral or written
[BCHINŻ_K03] Independently sets or implements a set action plan specifying priorities for its implementation; critically assesses its progress.	Is aware of the need of critical analysis of own work. Is aware of the necessity of fair and reliable work.	[SK4] test/exam - oral or written
[BCHINŻ_U08] Uses the chemical nomenclature and engineering terminology properly.	Uses chemical terminology necessary to present (both in oral and written form) the content presented in the course.	[SU4] test/exam - oral or written
[BCHINŻ_K04] Demonstrates responsibility for the safety of her/ his own and others' work.	Shows careful criticism in receiving information, especially available in mass media.	[SK4] test/exam - oral or written
[BCHINŻ_U09] Using the acquired knowledge, skills and various sources of scientific information independently prepares written papers and oral presentations.	Has the ability to predict the course and products of metabolic pathways. Predicts physicochemical and biological properties of organic compounds based on their chemical formulas.	[SU4] test/exam - oral or written
[BCHINŻ_U02] Uses basic methods, techniques and tools in formulating and solving engineering tasks in the field of chemistry.	Uses the basic analytical techniques applied for the analysis of endogenous organic compounds	[SU4] test/exam - oral or written
[BCHINŻ_U03] Plans, selects the appropriate research and measuring equipment and performs simple chemical experiments; analyses the results and draws conclusions based on them.	Designs and performs simple biochemical experiments, using appropriate laboratory equipment. Analyzes the results of performed experiments, draws conclusions about the correctness of their course.	[SU4] test/exam - oral or written
[BCHINŻ_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	Appreciates the need of ability to team work according to assigned role (team leader/team member).	[SK4] 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 ac-ids metabolism,amino acids metabolism, pentose phosphate pathway. Proteins G and signal transduction. Photosynthesis.DNA and RNA: replication, transcription, translation, PCR. Basics of genetic engineering.

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<tr><td>Prerequisites and co-requisites</td><td>Organic chemistry (bachelor level), fundamentals of organic chemistry, skills to work in a chemicallaboratory, knowledge of basic laboratory glassware, learning the principles of work in a biochemicallaboratory</td></tr>
<tr><td>Assessment methods and criteria</td><td>
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<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam - 5 open quastions; duration 90 min</td><td>51.0%</td><td>100.0%</td></tr>
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<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>J. M. Berg, J. L. Tymoczko, L. Stryer, Biochemia, PWN, Warszawa2009 and and subsequent editions</td></tr>
<tr><td>Supplementary literature</td><td>other academic textbooks for biochemistry</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>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.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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