

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Biochemistry, PG_00037491							
Field of study	Biotechnology							
Date of commencement of studies	October 2022		Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies		Subject group			Obligatory subject group in the field of study 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	3		Language of instruction			Polish		
Semester of study	5		ECTS credits			6.0		
Learning profile	general academic profile		Assessment form			exam		
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry							
Name and surname	Subject supervisor	dr hab. inż. Iwona Gabriel						
of lecturer (lecturers)	Teachers		dr hab. inż. Agnieszka Potęga					
		dr hab. inż. Iwona Gabriel						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM
	Number of study hours	60.0	15.0	0.0	0.0		0.0	75
	E-learning hours inclu	uded: 0.0						
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	Participation in consultation hours		Self-study		SUM
	Number of study hours	75		10.0		65.0		150
Subject objectives	To know the background knowledge about the function of living orfganisms in the field of biochemical data, means in the field of chemical structures, physicochemical interactions and biological processes							
Learning outcomes	Course outcome		Subject outcome			Method of verification		
	K6_W06		The student knows the physical and biochemical basis of biocatalysis. The student knows the basic principles of the structure of biomacromolecules.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	K6_W05		Know the background about the function of living organisms on the level of biochemical processes, taking into account the differences betwee eucaryotic and procaryotic cells. The student knows the main metabolic pathways and is able to assess the consequences of metabolic disorders.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		

Subject contents	1. The molecular basics of life. Bonds in biomolecules, entropy and thermodynamics laws, water molecule, pH, pKa, buffers.							
	2. Properties of amino acids, their non-protein functions, peptide bonds. Structure and functions of proteins.							
	3. Enzymes as catalysts, catalytic strategies, regulatory strategies.							
	4. Carbohydrates: structure of monosaccharides, role of disaccharides, oligosaccharides, protein glycosylation, glycoproteins.							
	5. Lipids, structure and functions. Fatty acids and other lipids, features of membrane lipids.							
	6. Structure and functions of cell membranes. Membrane channels and pumps cellular transport.							
	7. DNA, RNA, the structure of nucleic acids, DNA replication, transcription, the structure and functions of RNA, gene expression, protein synthesis on a DNA template.							
	8. Basic concepts of metabolism. The role of ATP in the course of thermodynamically unfavorable reactions. Catabolic and anabolic processes.							
	9. Glycolysis pathway and gluconeogenesis.							
	10. Citric acid cycle. Control mechanisms. The cycle as a source of biosynthetic precursors. The role of the glyoxal cycle.							
	11. Oxidative phosphorylation.							
	12. Fatty acid metabolism - degradation and biosynthesis.							
	13. Protein circulation and amino acids catabolism. Alanine and urea cycle.							
	<b>Biochemistry exercises</b> : The aim is to learn students the effective methods of biochemical process calculations. There is crucial for the preparation of the solutions with proper concentration for biochemical experiments as the rate of biochemical transformations or the molecular mechanisms of biochemical processes							
Prerequisites and co-requisites	The background knowledge in the fit	eld of biology, chemistry and physics	·					
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade					
and criteria	calculation exercises	60.0%	20.0%					
	Writting exam	60.0%	80.0%					
Recommended reading	Basic literature	J.M.Berg, J.L.Tymoczko, L.Stryer, Biochemistry, English version J.L.Tymoczko, J.M.Berg, L.Stryer, Biochemistry, short edition, English version						
	upplementary literature M.K. Campbell, S.O.Farell, Biochemistry, 2006							
	eResources addresses	Adresy na platformie eNauczanie:						

Example issues/ example questions/ tasks being completed	1. Which tricarbon molecules are formed by the degradation of fructoso-1,6-bisfosforan?
	2. What reaction do aminotransferases catalyze and what is their role in amino acid catabolism?
	<ol><li>Present the role of electron transfer from the cytric acid cycle by oxidative phosphorylation to ATP synthesis</li></ol>
Work placement	Not applicable

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