



Subject card

Subject name and code	Biochemistry, PG_00047752						
Field of study	Biomedical Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	first-cycle 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		
Semester of study	3	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Pharmaceutical Technology and Biochemistry -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Iwona Gabriel				
	Teachers		dr hab. inż. Iwona Gabriel				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		3.0		52.0	100
Subject objectives	The main purpose of this course is gaining knowledge about the structure and role of components of the living cells, including proteins, nucleic acids, polysaccharides and lipids and the main pathways of cellular metabolism.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U51] can conduct laboratory work connected with chemistry and biochemistry, specific to biomedical engineering	The student knows the basic laboratory techniques in the field of biochemistry and is able to analyze experimental data.	[SW1] Assessment of factual knowledge
	[K6_W52] Knows and understands, to an advanced extent, selected aspects of chemistry and biochemistry, constituting general knowledge related to the field of study	Student knows the main metabolic pathways and is able to estimate the consequences of metabolic disorders	[SW1] Assessment of factual knowledge
	[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	The student knows the physical and biochemical foundations of biocatalysis.	[SW1] Assessment of factual knowledge
	[K6_W03] knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	The student knows the basic principles of biomacromolecule structure.	[SW1] Assessment of factual knowledge
[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	The student knows the basic principles of planning and conducting experimental work in the field of biochemistry and is able to analyze experimental data.	[SU4] Assessment of ability to use methods and tools	
Subject contents	<ol style="list-style-type: none"> 1. Structure of prokaryotic and eukaryotic cells 2. Biomolecules - aminoacids, peptides and proteins 3. Biomolecules - sugars and polysaccharides 4. Biomolecules - lipids. Structure of biological membranes 5. Biomolecules - nucleic acids 6. Enzymes - structure, mechanisms of action and regulation 7. Main catabolic pathways - glycolysis, Krebs cycle, respiratory chain, fatty acids oxidation 8. Examples of anabolic pathways 9. Energetic coupling of metabolism. High-energy compounds 10. Integration and control of metabolic pathways 11. Genetic information and its transfer. Genetic code 12. DNA replication 13. Mutations in DNA. Mechanisms of mutagenesis and DNA repair 14. Etiology of hereditary metabolic diseases 15. Transcription 16. Protein biosynthesis. Role of chaperones 17. Biochemistry of selected physiological processes 18. Recombinant DNA technology 19. Biological and biochemical basis of tissue engineering 		
Prerequisites and co-requisites	<p>Knowledge of the selected topics of general chemistry: chemical bonds; intermolecular interactions, types and mechanisms of chemical reactions, properties of water, aqueous solutions, colloidal solutions.</p> <p>Knowledge of the selected topics of organic and physical chemistry: organic compounds - types and reactivity; theory of catalysis, thermodynamics and reaction kinetics</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test I	50.0%	50.0%
	Written test II	50.0%	50.0%
Recommended reading	Basic literature	D.B. Hames, N.M. Hooper, Biochemia. Krótkie wykłady, PWN W-wa 2007	
	Supplementary literature	J.M. Berg, L. Stryer, J. Tymoczko, Biochemia, PWN W-wa, 2007	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		