



## Subject card

Subject name and code	Biochemistry, PG_00047752						
Field of study	Biomedical Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject	2022/2023				
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 inż. Kamila Rząd 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						
Biochemia - sem. zimowy 2022 - Moodle ID: 22446 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22446">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=22446</a>							
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_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
	[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_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_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
Subject contents	<ol style="list-style-type: none"> <li>1. Structure of prokaryotic and eukaryotic cells</li> <li>2. Biomolecules - aminoacids, peptides and proteins</li> <li>3. Biomolecules - sugars and polysaccharides</li> <li>4. Biomolecules - lipids. Structure of biological membranes</li> <li>5. Biomolecules - nucleic acids</li> <li>6. Enzymes - structure, mechanisms of action and regulation</li> <li>7. Main catabolic pathways - glycolysis, Krebs cycle, respiratory chain, fatty acids oxidation</li> <li>8. Examples of anabolic pathways</li> <li>9. Energetic coupling of metabolism. High-energy compounds</li> <li>10. Integration and control of metabolic pathways</li> <li>11. Genetic information and its transfer. Genetic code</li> <li>12. DNA replication</li> <li>13. Mutations in DNA. Mechanisms of mutagenesis and DNA repair</li> <li>14. Etiology of hereditary metabolic diseases</li> <li>15. Transcription</li> <li>16. Protein biosynthesis. Role of chaperones</li> <li>17. Biochemistry of selected physiological processes</li> <li>18. Recombinant DNA technology</li> <li>19. Biological and biochemical basis of tissue engineering</li> </ol>		
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 II	50.0%	50.0%
	Written test I	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		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		