

## COURSE DESCRIPTION CARD

Białystok University of Technology									
Faculty of Mechanical Engineering									
Field of study	Biomedical Engineering							Degree level and programme type	.."
Specialisation/ diploma path	.."							Study profile	.."
Course name	Human biochemistry							Course code	IS-FME-00255S
								Course type	.."
Forms and number of hours of educational activities	L	C	LC	P	SW	FW	S	Semester	.."
	15		15					No. of ECTS credits	3
Entry requirements	-								
Course objectives	To familiarize students with the structure and functions of chemical substances found in living organisms. To familiarize students with the basic metabolic processes and the biological role of biomolecules (proteins, enzymes, carbohydrates, fats, nucleic acids). Developing the principles and skills of performing simple biochemical analyses. Acquiring competences to improve professional qualifications in the field of biochemistry.								
Course content	<p><b>Lecture:</b> Structure of a cell. The role of elements in the body. Division and role of vitamins. Biological fluids. Structure and biochemical characteristics of the basic components of matter: proteins, carbohydrates, fats. Proteins - structure, division and functions. Enzymes as biocatalysts - structure, classification and mechanisms of action. Coenzymes and their role. Carbohydrates - systematics, structure, physical and chemical properties, metabolism. Fats – division, structure, properties, occurrence and their role. Structure, functions and types of nucleic acids. Storage, transmission and expression of genetic information. <b>Laboratory:</b> Rheological properties of biological fluids on the example of saliva and synovial fluid. The use of polarimetric, densimetric and refractometric techniques in determining sugar concentration. Characteristic reactions of carbohydrates - determining the properties and structure of sugars. Protein properties - determination of isoelectric point. Application of spectrophotometry for quantitative determination of proteins. Lipids - structure, properties and characteristic reactions.</p>								
Teaching methods	<p>Informative and problem-based lecture;</p> <p>Laboratory exercises.</p>								

<b>Assessment method</b>	Lecture: two written tests; Laboratory classes: evaluation of entry tests, reports, discussions and activity in classes.	
<b>Symbol of learning outcome</b>	<b>Learning outcomes</b>	<b>Reference to the learning outcomes for the field of study</b>
	<b>Knowledge: the graduate knows and understands</b>	
LO1	basic groups of organic compounds found in the human body	IB1_W01
LO2	basic laws and principles of metabolic processes	IB1_W01
LO3	basics of the functioning of the human body, with particular emphasis on biochemical processes	IB1_W01
LO4	principles of promoting and implementing sustainable development policy	IB1_W12
	<b>Skills: the graduate is able to</b>	
LO5	perform simple biochemical tests	IB1_U01 IB1_U02 IB1_U04 H1_U02
	<b>Social competence: the graduate is ready to</b>	
LO6	compliance with the rules of teamwork	IB1_K05 H1_K01
<b>Symbol of learning outcome</b>	<b>Methods of assessing the learning outcomes</b>	<b>Type of tuition during which the outcome is assessed</b>
LO1	Lecture: written test.	L
LO2	Lecture: written test.	L
LO3	Lecture: written test.	L
LO4	Lecture: written test.	L
LO5	Laboratory classes: evaluation of entry tests, reports, discussions and activity in classes.	LC
LO6	Laboratory classes: evaluation of entry tests, reports, discussions and activity in classes.	LC
<b>Student workload (in hours)</b>		<b>No. of hours</b>
<b>Calculation</b>	Lecture attendance	15
	Participation in laboratory classes	15
	Preparation for the lecture exam	5
	Preparation for laboratory classes	10
	Participation in consultations	5

	<b>TOTAL:</b>	<b>50</b>	
	<b>Quantitative indicators</b>	<b>HOURS</b>	<b>No. of ECTS credits</b>
	<b>Student workload – activities that require direct teacher participation</b>	<b>35</b>	<b>1,4</b>
	<b>Student workload – practical activities</b>	<b>30</b>	<b>1,2</b>
<b>Basic references</b>	1. Knopp J.A., Hardin Ch.C., Biochemistry – Essential Concepts, Oxford University Press, 2013, zasób online. 2. Ahern K., Rajagopal I., Tan T., Biochemistry: Free For All, Corvallis, Oregon: Oregon State University, 2018, zasób online. 3. Kłyszajko-Stefanowicz L.: Cytobiochemia-biochemia niektórych struktur komórkowych, Wydawnictwo Naukowe PWN, Warszawa, 2015. 4. Kłyszajko-Stefanowicz L.: Ćwiczenia z biochemii, Wydawnictwo Naukowe PWN, Warszawa, 2022. 5. Ledakowicz S.: Inżynieria biochemiczna, Wydawnictwo Naukowo-Techniczne, Warszawa, 2018.		
<b>Supplementary references</b>	1. Rouanlt T., Maio N., Dos Santos P., Dean D., Outten W., Outten C., Mettert E.L., Kiley P., Dancis A., Tong W.H., Biochemistry, Biosynthesis and Human Diseases, Berlin/Boston: Walter de Gruyter GmbH, 2017, zasób online. 2. Kączkowski J.: Podstawy biochemii, Wydawnictwo Naukowo-Techniczne, Warszawa, 2022 3. Brzózka Z.: Mikrobioanalitka, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2009. 4. Preżdo W.: Zbiór zadań i ćwiczeń z biochemii, Wydawnictwo Uniwersytetu Jana Kochanowskiego, Kielce, 2013. 5. Hames B.D.: Biochemia, Wydawnictwo Naukowo-Techniczne PWN, Warszawa, 2012.		
<b>Organisational unit conducting the course</b>	Institute of Biomedical Engineering	<b>Date of issuing the programme</b>	
<b>Author of the programme</b>	Assoc. Prof. Joanna Mystkowska, DSc, PhD, Eng.	27.03.2024	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar