

**Subject card**

<b>Subject name and code</b>	Biochemistry of proteins , PG_00198165						
<b>Field of study</b>	Biotechnology						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Master's studies	<b>Subject group</b>			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	1	<b>ECTS credits</b>			4.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Łukasz Rąbalski				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	0.0	60.0	0.0	0.0	60
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	<b>Participation in didactic classes included in study plan</b>		<b>Participation in consultation hours</b>		<b>Self-study</b>	<b>SUM</b>
	<b>Number of study hours</b>	60		10.0		30.0	100
<b>Subject objectives</b>	Conveying in-depth knowledge of techniques used for work with proteins, also at the molecular level (properties of proteins and their interactions, chromatographic purification, electrophoretic analysis, quantitative determination and immunodetection of proteins). Acquiring in-depth knowledge of the principles of health and safety in a biotechnology laboratory, including work with biological agents and GMM. Acquiring the ability to document activities and results; operate laboratory equipment, teamwork, collecting and interpreting data and making conclusions, including statistical analysis.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHMU2_U01] The graduate possesses the skills necessary to design and conduct laboratory research, critically assessing risks, method limitations, and ethical implications of undertaken activities.	The student possesses in-depth laboratory skills in working with proteins, including the use of appropriate research equipment; from the planning stage of the experiment, through its execution while applying suitable controls, to proper documentation of the work and interpretation of results. Under the guidance of a supervisor, they apply more complex techniques (sonification, chemiluminescence detection, ultrafiltration). The student works in accordance with health and safety regulations and understands the hazards associated with laboratory work.	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
	[BIOTECHMU2_W06] The graduate has in-depth knowledge and understands the risks associated with conducting laboratory works, including those resulting from working with infectious material, GMOs and GMMs.	The student is able to conduct laboratory research responsibly and in accordance with legal regulations using infectious materials, GMOs, and GMMs.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report
	[BIOTECHMU2_W01] The graduate has in-depth knowledge of complex biological phenomena at the molecular level and knows their importance for biotechnology, is able to analyze them in an interdisciplinary approach and assess their ethical, social and environmental implications.	The student has an integrated understanding of how to carry out a project on the overexpression of a recombinant gene in a bacterial system, obtaining a protein preparation and being able to analyze it.	[SW2] presentation/project/paper/report [SW3] text preparation/written work
	[BIOTECHMU2_U03] The graduate is able to work independently and in a team, including acting as a leader, demonstrating social maturity, empathy and responsibility for the team and the decisions made.	The student is capable of working independently and in a small (2-3 person) team during laboratory activities and the preparation of the final report, effectively dividing tasks.	[SU2] presentation/project/paper/report [SU8] observation of student's independent or team work
Subject contents	The content of the laboratory exercises includes in-depth knowledge of techniques used in work with proteins. The principles of safety and hygiene in a biotechnology laboratory will also be presented, as well as the hazards associated with conducting laboratory research, including risks related to working with pathogenic organisms and GMOs/GMMs. Students will conduct exercises in teams of 2-3 people using the following techniques: isolation of proteins from natural sources (e.g., egg white) or recombinant sources ( <i>E. coli</i> expression system); protein purification using various chromatographic methods; and detection and analysis of proteins (SDS-PAGE, Western blotting, ELISA).		
Prerequisites and co-requisites	The completion of the course: Biochemistry (as a separate course or within other courses) is required. Knowledge of methods for calculating solution concentrations is required, which will be assessed in a written test during the first class.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Points from the Lab Evaluation Rubrics	51.0%	25.0%
	Points from the final test	51.0%	50.0%
	Points from the written report	51.0%	25.0%
Recommended reading	Basic literature	Chmielewska A, Krol E, Lipinska A, Rychlowska M: "Protein Biochemistry lab - laboratory manual" (current year edition) - provided during the first classes.	
	Supplementary literature	Resources provided by supervisors and library/on-line resources based on topics provided during classes.	
	eResources addresses		
Example issues/example questions/tasks being completed	Open questions during the final test.		
Work placement	Not applicable		

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