

**Subject card**

<b>Subject name and code</b>	Protein phosphorylation in bacteria, PG_00197620						
<b>Field of study</b>	Biotechnology						
<b>Date of commencement of studies</b>	October 2025	<b>Academic year of realisation of subject</b>				2026/2027	
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>				Obligatory subject group in the field of study Optional subject group 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>	2	<b>Language of instruction</b>				Polish	
<b>Semester of study</b>	3	<b>ECTS credits</b>				2.0	
<b>Learning profile</b>	academic	<b>Assessment form</b>				credit	
<b>Conducting unit</b>	Intercollegiate Faculty of Biotechnology Office -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		prof. dr hab. Michał Obuchowski				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	14.0	0.0	0.0	0.0	0.0	14
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM		
	<b>Number of study hours</b>	14	5.0	31.0	50		
<b>Subject objectives</b>	The aim of the course is to provide knowledge about the chemistry of protein phosphorylation and its significance for all living organisms. The student becomes familiar with selected protein phosphorylation systems functioning in various bacterial species at the molecular level, learns to identify the relationships between these systems and the behavior of microorganisms in the environment, and to predict the consequences of their malfunction for bacterial cell physiology and interactions with other living organisms.						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>		<b>Method of verification</b>		
	[BIOTECHL3_W01] The graduate possesses structured and advanced knowledge of biological phenomena at the molecular level and understands their importance for biotechnology.		The student knows and is able to describe selected protein phosphorylation systems occurring in various bacterial species at the molecular level.		[SW4] test/exam - oral or written		
	[BIOTECHL3_W03] The graduate possesses structured and advanced knowledge of organism-environment relationships and their importance for understanding biological processes and biotechnological applications.		The student is able to identify relationships between protein phosphorylation systems and microbial behavior in the environment, and to predict the effects of their disruption on bacterial cell physiology and interactions with other organisms.		[SW4] test/exam - oral or written		
<b>Subject contents</b>	General concept of regulation of protein activity by phosphorylation. Structure and function of protein kinases and phosphatases. Selected examples of systems using protein phosphorylation such as: regulation of the chemotactic response in bacteria ( <i>E. coli</i> ), operation of the general stress response mechanism ( <i>B. subtilis</i> ), control of the absorption of bioavailable nitrogen ( <i>E. coli</i> ), regulation of virulence ( <i>V. cholerae</i> and <i>P. aeruginosa</i> ), formation of bacterial spores ( <i>B. subtilis</i> ), regulation of bacterial bioluminescence ( <i>V. fischeri</i> , <i>V. harveyi</i> ), mechanism of acquiring natural genetic competence ( <i>B. subtilis</i> ), regulation of phosphorylation-coupled sugar transport into the cell ( <i>B. subtilis</i> ).						
<b>Prerequisites and co-requisites</b>							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final colloquium	51.0%	100.0%
Recommended reading	Basic literature	"Protein phosphorylation in bacteria" script, literature indicated by the lecturer.	
	Supplementary literature	None	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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