

Subject card

Subject name and code	Enzymes for environmental sustainability, PG_00179656						
Field of study	Environmental Protection						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Laboratory of Bioorganic Chemistry -> Department of Molecular Biochemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Dawid Dębowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
Subject objectives	Understanding and learning the fundamental concepts and laws in the field of enzymology.						
	Becoming familiar with the structure, role, and mechanisms of action of selected classes of enzymes.						
	Exploring examples of enzyme applications in environmental protection.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OŚMU2_U01] On the basis of the acquired knowledge, proposes to solve environmental problems.	Is aware of the usefulness of enzymes in environmental protection. Knows examples of enzyme applications in environmental protection. Knows the advantages and disadvantages of such solutions.	[SU1] oral statement/conversation/discussion
	[OŚMU2_W01] Describes complex phenomena and processes occurring in nature, including those related to the spread of anthropogenic pollution.	Describes the structure of enzymes and their active sites, lists the basic functions and properties of enzymes. Explains the concept of enzymatic specificity using selected enzyme examples. Describes the factors that influence the catalytic activity of enzymes. Distinguishes and characterizes the basic types of enzymes. Knows the methods of enzyme immobilization on carriers.	[SW1] oral statement/conversation/discussion
	[OŚMU2_U05] Searches, selects and analyses the literature achievements of environmental sciences, including scientific journals and databases, reading and understanding scientific texts in her/his native language and in English.	Demonstrates the ability to locate and critically evaluate information from scientific literature.	[SU1] oral statement/conversation/discussion
	[OŚMU2_W05] Describes development directions and the latest discoveries in the field of scientific disciplines related to environmental protection.	Knows the latest examples of enzyme applications in environmental protection.	[SW1] oral statement/conversation/discussion
	[OŚMU2_W04] Chooses methods, techniques and research tools used in environmental protection.	Is familiar with the advantages and limitations of selected laboratory devices and techniques used to assess enzymatic activity. Is familiar with the advantages and limitations of laboratory techniques used for enzyme immobilization.	[SW1] oral statement/conversation/discussion
	[OŚMU2_K06] Recognises the importance of knowledge in solving encountered cognitive and practical problems and consults experts in the event of difficulties in solving a problem on her/his own.	Understands the need for continuous learning and updating of knowledge. Demonstrates cautious critical thinking when accepting information, especially that available in mass media.	[SK1] oral statement/conversation/discussion
	[OŚMU2_K01] Behaves in a professional manner at all times; bears full responsibility for the actions taken relating to the protection of the environment and respects the principles of professional ethics and principles of intellectual honesty.	Demonstrates the need for continuous professional development. Identifies and resolves dilemmas related to assessing environmental exposure to pollutants, and understands the importance of ethical reflection. Is aware of the risks associated with the emission of pollutants into the environment.	[SK1] oral statement/conversation/discussion
	[OŚMU2_K10] Has a need for continuous professional development.	Understands the need for continuous learning and updating of knowledge. Is aware of the importance of critically analyzing one's own work and source data.	[SK1] oral statement/conversation/discussion

Subject contents	Basic concepts in enzymology.		
	Basic classification of enzymes.		
	Factors affecting enzyme activity.		
	Enzyme immobilization.		
	Applications of enzymes in environmental protection (e.g. degradation of pharmaceutical compounds, synthetic plastics)		
Prerequisites and co-requisites	Basic knowledge of organic chemistry.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Oral presentation / conversation / discussion	0.0%	100.0%
Recommended reading	Basic literature	J. M. Berg, J. L. Tymoczko, L. Stryer, "Biochemistry", PWN, Warszawa 2009. E. Bańkowski "Biochemistry", Elsevier Urban & Partner Wrocław 2004.	
	Supplementary literature	R.A. Copeland "Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis", 2nd Edition, Wiley	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Basic concepts in enzymology.		
	Basic classification of enzymes.		
	Factors affecting enzyme activity.		
	Enzyme immobilization.		
	Applications of enzymes in environmental protection		
Work placement	Not applicable		

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