

Subject card

Subject name and code	Genetically modified organisms in environmental protection, PG_00103547						
Field of study	Environmental Protection						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	academic		Assessment form				
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Barbara Kędzierska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	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	30		5.0		15.0	50
Subject objectives	Knowledge and understanding of the processes involved in replication, expression and variation of genetic material. Knowledge of a variety of molecular biology techniques that enable the creation of genetically modified organisms and the possibility of their use in various environmental aspects.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[OŚL3_K05] Identifies the level of her/his knowledge and skills, demonstrates the need to update knowledge about the environment and its protection, demonstrates the need for continuous professional training and personal development.		explains the theoretical basis of the most important genetic engineering techniques		[SK1] oral statement/conversation/discussion [SK4] test/exam - oral or written		
	[OŚL3_W05] Explains the course of natural and anthropopressional physical, chemical and biological processes and phenomena occurring in nature at various levels of matter organisation.		describes and understands the molecular mechanisms of genetic information flow, regulation of gene expression, and sources of genetic variation in living organisms		[SW4] test/exam - oral or written		
	[OŚL3_W02] Characterises the relationships and relationships between various disciplines of natural sciences and science, uses knowledge of mathematics, physics, chemistry and biology in the description of basic concepts, concepts and principles in environmental protection.		explains the theoretical basis of the most important techniques of genetic engineering demonstrates the relationship between the achievements of molecular biology and the possibilities of their use in environmental protection recognizes the risks and benefits of using genetically modified organisms in everyday life and environmental protection		[SW4] test/exam - oral or written		

Subject contents	Processes involved in the flow of genetic information in living organisms. Mechanisms of regulation of gene expression. Mutations, mutagenesis, mutagenic agents and processes of repair of genetic material. Genetic engineering techniques necessary for the construction of strains with new properties. The use of genetically modified organisms for the production of drugs, vaccines, enzymes used in various industries, biofuels and others. Examples of genetic modification of crop plants. The role of GMOs and GMMs in environmental monitoring and processes for removing chemical contaminants from water and soil. Strategies to safeguard against the spread of transgenes. Legal regulations related to GMOs.		
Prerequisites and co-requisites	Courses in chemistry, general biology, microbiology, biochemistry Basic knowledge of chemistry and the ability to use it in the laboratory to properly prepare solutions, buffers, and maintain safety at work; ability to work sterile and conduct bacterial cultures; basic knowledge of nucleic acids and proteins.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	51.0%	100.0%
Recommended reading	Basic literature	the lecture is based on numerous original publications and unpublished materials, its content is not included in any textbook • Krystyna Kowal, Zdzisława Libudzisz, Zofia Żakowska. Mikrobiologia techniczna. PWN 2023 • P. Węgleński, Genetyka molekularna, PWN 2012 • publications indicated by the lecturer	
	Supplementary literature	• Buchowicz J. Biotechnologia molekularna, PWN 2009 • Klimiuk E, Łebkowska M. Biotechnologia w ochronie środowiska, PWN 2008 • M. Sęktas Zastosowanie inżynierii genetycznej w biotechnologii. WUG 2000	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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