University of Gdańsk

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 2026	Academic year of realisation of subject	2028/2029
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	credit
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_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
[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_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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>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.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>written test</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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</td></tr><tr><td>Supplementary literature</td><td>• 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</td></tr><tr><td>eResources addresses</td><td></td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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