University of Gdańsk

Subject card

Subject name and code	Microorganisms in biotechnology, PG_00132874						
Field of study	Criminology						
Date of commencement of studies	October 2025		Academic year of realisation of subject	2025/2026			
Education level	Bachelor's studies		Subject group				
Mode of study	full-time studies		Mode of delivery	e-learning			
Year of study	1		Language of instruction	Polish Polish			
Semester of study	1		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Laboratory of Bionanotechnology -> Department of Molecular Biotechnology -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Joanna Jeżewska-Frąckowiak				
	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: 30.0						
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		0.0	20.0		50
Subject objectives	Familiarizing students with the issues mentioned in the lecture program content						

Learning outcomes

Course outcome	Subject outcome	Method of verification
	Learning outcomes K_W05: uses extended knowledge in the field of the studied specialization K_W11: demonstrates general knowledge of the current directions of development of chemistry as a science and the latest discoveries in this field; K_K01: knows the limitations of their own knowledge, understands the need for further education and is able to inspire others to do so. 1. The student lists and characterizes groups of microorganisms used in biotechnology. 2. The student characterizes preparations obtained by biotechnological methods, provides the method of their obtaining and examples of applications. 3. The student describes biotechnological processes using microorganisms. The student correctly presents issues related to the program content of the lecture, using appropriately selected sources. The student sees the important role and wide spectrum of issues related to the use of microorganisms in modern biotechnology. Understands the need for further curiosity and education in this area	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task [SK2] presentation/project/paper/ report

Subject contents

Definitions of biotechnology and biotechnological process. Molecular cloning and cloning of organisms. Obtaining GMOs. Tools and techniques of molecular biotechnology. Elements of biotechnological process design. Phylogenetic tree, groups of microorganisms used in biotechnology. Sources of obtaining microorganisms for biotechnological purposes. Conventional and genetically modified microorganisms. Biotechnological applications of complete microorganisms and products obtained from them, native and recombinant enzymes. Biotechnological preparations of microbiological origin - characteristics of the production process and properties of the preparation containing microorganisms or their elements. Isolation and purification of recombinant proteins. Characteristics of selected biotechnological processes using microorganisms, examples of white, green and red biotechnology: waste management, biofuels, drugs and pharmaceuticals, food, probiotics. Legal basis for the use of microorganisms and genetically modified microorganisms in biotechnology.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
worksheet - problem tasks during the lecture	0.0%	25.0%
presentation prepared in pairs	0.0%	75.0%

Recommended reading

Basic literature

1. Glick, B.R., Pasternak, J.J., Patten, C.L.: Molecular biotechnology: Principles and applications of recombinant DNA. ASM PRESS, 2009

2. Joshi VK, Singh RS: Food Biotechnology. Principles and practices. IK International Publishing House Pvt. Ltd, New Delhi, 2012

3. Klimiuk E., Łebkowska M.: Biotechnologia w ochronie środowiska, PWN, 2005

4. Libudzisz Z., Kowal K., Żakowska Z.: Mikrobiologia techniczna, tom 1, 2, PWN 2008

5. Olańczuk-Neyman K.: Laboratorium z biologii środowiska, Wyd. PG, 1998

	Supplementary literature	6. Berkeley RM, Heyndrickx NL, De Vos P: Applications and systematics of Bacillus and relatives. Wiley-Blackwell. Oxford, 2008 7. Chavarri M, Maranon I, Villaran MC: Encapsulation Technology to Protect Probiotic Bacteria. In Probiotics. Ch23 pp 501-540. InTech, Rijeka, Rigobelo, 2012 http://dx.doi.org/10.5772/50046 8. Goderska K: Different Methods of Probiotics Stabilization. In Probiotics. Ch24 pp 541-550. InTech, Rijeka, Rigobelo, 2012 http://dx.doi.org/10.5772/50313 9. Indicated on-line resources.
	eResources addresses	
Example issues/ example questions/ tasks being completed	An example of the use of a selected microorganism in biotechnology An idea for a biotechnological product using microorganisms.	
Work placement	Not applicable	

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