University of Gdańsk

Subject card

Subject name and code	Microorganisms in biotechnology, PG_00121248		
Field of study	Chemical Business, Chemistry, Environmental Protection		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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	3	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	dr Joanna Jeżewska-Frąckowiak	

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

Additional information:

multimedia presentation, student project, student presentation, pair work, peer review

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

Familiarizing students with the issues mentioned in the lecture program content.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEMMU2_W05] Has extended knowledge in the field of the specialisation studied.	The student lists and characterizes groups of microorganisms used in biotechnology. The student characterizes preparations obtained using biotechnological methods, provides the method of obtaining them and examples of applications.	[SW1] oral statement/ conversation/discussion
[CHEMMU2_K01] Knows the limitations of her/his own knowledge; understands the need for further education and can inspire other people to do so.	The student presents the applications of microorganisms in various industrial fields in a factually correct manner, using independently selected reliable sources.	[SK2] presentation/project/paper/ report
[CHEMMU2_W11] Demonstrates general knowledge about the current trends in the development of chemistry as a science and the latest discoveries in this field.	The student describes biotechnological processes carried out using microorganisms	[SW5] implementation of a problem task

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
presentation prepared in pairs	0.0%	75.0%
worksheet - problem tasks during the lecture	0.0%	25.0%

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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