



Subject card

Subject name and code	GENERAL BIOTECHNOLOGY, PG_00063450						
Field of study	Biotechnology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department Of Chemistry Technology And Biotechnology Of Food -> Faculty Of Chemistry -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Filipkowski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		10.0		45.0	100
Subject objectives	The aim of the course is to familiarize students with the knowledge of the use of traditional and modern biotechnology methods in various areas of human life, including agriculture, food processing, medicine and environmental protection.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W05] identifies crucial developments in research, apparatus and technology in biotechnology and related fields		identifies key directions for the development of research, equipment and techniques in biotechnology and related fields and is able to propose specific equipment solutions		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U04] predicts the interaction of biomolecules and biologically active compounds on living organisms and the course of processes involving them based on knowledge in biology, biotechnology and related fields and computer methods of data analysis, modeling and simulation		predicts the impact of nutrients on living organisms and the course of processes involving them based on knowledge of biology, biotechnology and related fields as well as computer methods of data analysis, modeling and simulation		[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		
	[K7_W07] has the skills to design experiments with respect to the protection of intellectual property and the principles of bioethics and applicable legislation		has the ability to design experiments while maintaining the protection of intellectual property and the principles of bioethics and applicable legal regulations in biotechnology		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_K02] is aware of the potential risks and opportunities associated with the development of science and technology for the natural environment and society		The student is aware of all aspects of biotechnological activity, including its impact on the environment, the biotechnological methods used in various areas of human life, and understands the need to constantly update the state of knowledge in this area.		[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills		

Subject contents	<p>Lecture. Biotechnology as interdisciplinary science, basic definitions, history, classification.</p> <p>Basics of bioprocesses. General characteristics of microorganisms used in biotechnological processes. Their selection, improvement. Nutritional requirements of microorganisms. The influence of physicochemical factors on the growth of microorganisms. Biomass production. Methods of isolation and purification of a biotechnological product. Characteristics, development and organization of fermentation processes and their importance in the production and preservation of food and in environmental protection.</p> <p>Issues related to agrobiotechnology and plant biotechnology - methods of traditional plant selection, <i>in vitro</i> tissue cultures, and marker assisted selection, genetic engineering and GMO crops.</p> <p>Application of biotechnology in health care: secondary metabolites, antibiotics, vitamins, recombinant proteins, monoclonal antibodies, stem cells, gene therapy, tissue engineering.</p> <p>Ecological and legal problems related to biotechnology. Possible threats to the environment.</p> <p>Laboratory. Conducting selected fermentation processes. The use of strains of microorganisms for the production of products included in functional foods. Conducting the culture of selected microorganisms in the bioreactor.</p>		
Prerequisites and co-requisites	General knowledge of chemistry and basic biology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	50.0%
	Practical exercise and reports from the exercises	100.0%	20.0%
	Test before each of the experiments	60.0%	30.0%
Recommended reading	<p>Basic literature</p> <ul style="list-style-type: none"> - Podstawy biotechnologii red. C. Ratledge. PWN, 2011 - whatever polish or english version - Chmiel A. Biotechnologia i Chemia Antybiotyków. PWN, Warszawa, 1998. - Chmiel A. Biotechnologia. PWN, Warszawa, 1991. - Leśniak W. Biotechnologia Żywności, Procesy Fermentacji i Biosyntezy. Wydawnictwo Akademii Ekonomicznej, Wrocław, 2002. - Bal J. Biologia Molekularna w Medycynie. Elementy Genetyki Klinicznej. PWN, Warszawa, 2001. - Libudziś Z., Kowal K. Mikrobiologia Techniczna, T.1 i 2. Wydawnictwo Politechniki Łódzkiej, Łódź, 2000. - Szewczyk K.W. Technologie Biochemiczne. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2003. - Praca zb. Pod red. J Synowiecki: Wybrane zagadnienia z technologii fermentacyjnych przemysłu spożywczego. Wyd. PG., Gdańsk, 2009 		

	Supplementary literature	<p>1.Bednarski W. Biotechnologia Żywności. WNT, Warszawa, 2000.</p> <p>2.Buraczewski G. Biotechnologia Osadu Czynnego. PWN, Warszawa, 1994.</p> <p>3.Lewandowski M. W. Proekologiczne Źródła Energii Odnawialnej. WNT, Warszawa, 2001.</p> <p>4.Lewis M. J., Young T.W. Piwowarstwo. PWN, Warszawa, 2001.</p> <p>5.Malepszy S. Biotechnologia Roślin. PWN, Warszawa, 2001.</p> <p>6.Singleton P. Bakterie w Biologii, Biotechnologii i Medycynie. PWN, Warszawa, 2000.</p> <p>7.Leśniak W, Biotechnologia żywności, Procesy fermentacji i biosyntezy,</p> <p>Wyd. AE, Wrocław 2002</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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