GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	General Biotechnology, PG_00048899		
Field of study	Chemistry		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2023/2024
Education level	first-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	4	Language of instruction	Polish
Semester of study	7	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Filipkowski	
	Teachers	dr inż. Paweł Filipkowski dr inż. Izabela Sinkiewicz prof. dr hab. inż. Agnieszka Bartoszek-Pączkowska	

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
	[K6_K03] understands the importance of group and team activities in which members adopt various roles	The student understands the advantage of cooperation of specialists from various fields of science, engineering and other sciences in the creation and course of the biotechnological process	[SK1] Assessment of group work skills
	[K6_U04] can use professional vocabulary, can prepare and communicate technical information in the form of text documents, spreadsheets, charts and technological schema	For example, the student can draw a simple diagram of a bioreactor	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_W06] has a basic knowledge about the use of micro-organisms and their metabolic products in the production of goods and services, taking into account, inter alia, the role of genetic engineering, necessary for the application of biotechnological processes in various areas: food, chemical and mining industries, fuel production, agriculture and environmental protection	The student has a basic knowledge of what biocatalysts can be used for the production of goods and services, e.g. in the food industry.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
	[K6_K07] is aware of his social role as a graduate of a Technical University, especially in presenting information and opinion to the public about the risks and opportunities posed by chemical sciences; undertakes actions to communicate such information in a comprehensible manner	The student is aware of and is able to convey to the society the importance and impact of biotechnological methods used in various areas of human life, primarily in medicine and environmental protection.	[SK4] Assessment of communication skills, including language correctness
	[K6_K02] is aware of the importance of the beyond-technical aspects and effects of engineering activities, including its environmental impact and the associated responsibility for the decisions made	The student is aware of all aspects, including its impact on the environment, of the biotechnological methods used in various areas of human life, primarily in medicine and environmental protection.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	Lecture. Biotechnology as interdisciplinary science, basic definitions, history, classification. 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. Issues related to agrobiotechnology and plant biotechnology - methods of traditional plant selection, *in vitro* tissue cultures, and marker assisted selection, genetic engineering and GMO crops. Application of biotechnology in health care: secondary metabolites, antibiotics, vitamins, recombinant proteins, monoclonal antibodies, stem cells, gene therapy, tissue engineering. Ecological and legal problems related to biotechnology. Possible threats to the environment. 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.
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
	Practical exercise and reports from the exercises	100.0%	20.0%
	Test before each of the experiments	60.0%	30.0%
	Exam	60.0%	50.0%

Recommended reading		
	Basic literature	- 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. - Libudzisz 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	1.Bednarski W. Biotechnologia Żywności. WNT, Warszawa, 2000. 2.Buraczewski G. Biotechnologia Osadu Czynnego. PWN, Warszawa, 1994. 3.Lewandowski M. W. Proekologiczne Źródła Energii Odnawialnej. WNT, Warszawa, 2001. 4.Lewis M. J., Young T.W. Piwowarstwo. PWN, Warszawa, 2001. 5.Malepszy S. Biotechnologia Roślin. PWN, Warszawa, 2001. 6.Singleton P. Bakterie w Biologii, Biotechnologii i Medycynie. PWN, Warszawa, 2000. 7.Leśniak W, Biotechnologia żywności, Procesy fermentacji i biosyntezy, Wyd. AE, Wrocław 2002
	eResources addresses	Adresy na platformie eNauczanie: '23/'24 Biotechnologia ogólna (dla kierunku Chemia i BT"0") - Moodle ID: 33828 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33828
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	