GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	General Biotechnology, PG_00058227		
Field of study	Biotechnology		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
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 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
[K7_U10] is able to use knowledge about possibilities, aims and limitations of biotechnology to develop, design and obtain products and biotechnological processes in the area of his/her specialization	The student is able to propose a biocatalyst and process conditions for obtaining a given biotechnological product.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K7_W03] has a structured knowledge of biotechnological applications of model organisms, microorganisms and viruses in the context of conducting bioprocesses and obtaining desired substances	The student has basic knowledge what biocatalysts it can use 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
[K7_K02] is aware of the limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training	The student is aware all aspects of biotechnology including her environmental impact, methods used applied biotechnology in various areas of life human and understands the need to constantly update the state of knowledge in this area.	[SK1] Assessment of group work skills [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
Test before each of the experiments	60.0%	30.0%
Practical exercise and reports from the exercises	100.0%	20.0%
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:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	