



Subject card

Subject name and code	General Biotechnology, PG_00058227						
Field of study	Biotechnology						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
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_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.			[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills		
	[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.			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
[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.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject			

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	<table border="1"> <thead> <tr> <th data-bbox="456 898 794 925">Subject passing criteria</th> <th data-bbox="799 898 1137 925">Passing threshold</th> <th data-bbox="1142 898 1481 925">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 931 794 958">Exam</td> <td data-bbox="799 931 1137 958">60.0%</td> <td data-bbox="1142 931 1481 958">50.0%</td> </tr> <tr> <td data-bbox="456 965 794 1014">Practical exercise and reports from the exercises</td> <td data-bbox="799 965 1137 1014">100.0%</td> <td data-bbox="1142 965 1481 1014">20.0%</td> </tr> <tr> <td data-bbox="456 1021 794 1070">Test before each of the experiments</td> <td data-bbox="799 1021 1137 1070">60.0%</td> <td data-bbox="1142 1021 1481 1070">30.0%</td> </tr> </tbody> </table>			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%
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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. - 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	<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, Wyd. AE, Wrocław 2002</p>
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	