University of Gdańsk

Subject card

Subject name and code	Biotechnological processes in the chemical industry, PG_00080741						
Field of study	Chemical Business						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2026/2027			
Education level	undergraduate 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	3		Language of instruction	Polish			
Semester of study	6		ECTS credits	1.0			
Learning profile	academic		Assessment form				
Conducting unit	Pracownia Bionanotechnologii -> Katedra Biotechnologii Molekularnej -> Faculty of Chemistry -> Rektor						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Joanna Jeżewska-Frąckowiak					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
	Additional information: presentation, online materials: films, applications, computer programs, databases						
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	15		2.0		8.0	25
Subject objectives	1. Familiarizing students with the issues mentioned in the lecture program content. 2. Familiarization with the issues of classical and molecular biotechnological processes in the chemical industry and the prospects for the application of molecular biotechnology methods.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BCHINŻ_U03] Plans, selects the appropriate research and measuring equipment and performs simple chemical experiments; analyses the results and draws conclusions based on them.	Conducts experiments planned in the program, documents and develops the results.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU8] observation of student's independent or team work
[BCHINŻ_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	Creates student teams in which they complete assigned tasks on time and correctly.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[BCHINŻ_U06] Proposes and makes simple devices, operations or unit processes related to the implementation of the technological process used in the chemical industry, taking into account material and energy balances.	Obtains biotechnological products using classical and molecular techniques, then characterizes them and/or prepares a balance sheet.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU8] observation of student's independent or team work
[BCHINŻ_W05] Describes the life cycle of devices, facilities and technical systems as well as modern environment-friendly technical solutions.	The student knows the strategies for obtaining biotechnological products in various industrial fields, within the principles of circular economy.	[SW4] test/exam - oral or written
[BCHINŻ_K03] Independently sets or implements a set action plan specifying priorities for its implementation; critically assesses its progress.	The student plans and performs assigned tasks independently and in a group laboratory, manages time and available infrastructure.	[SK2] presentation/project/paper/ report [SK8] observation of student's independent or team work
[BCHINŻ_K04] Demonstrates responsibility for the safety of her/ his own and others' work.	Working in a student team, the student plans an experiment in a biotechnology laboratory, applies GLP and Health and Safety principles.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[BCHINŻ_W07] Describes the construction and operating principles of basic scientific, technological and control-measuring apparatus.	The student knows the concept of biotechnological process and operation and the principles of designing biotechnological processes for various branches of the chemical industry.	[SW4] test/exam - oral or written

Subject contents

Definitions and elements of the biotechnological process and biotechnological operations. History of biotechnology products. Native, recombinant and model microorganisms, cell and tissue culture databases. Molecular cloning. Groups of microorganisms of biotechnological importance. Characteristics of selected biotechnological products in various branches of the chemical industry. Chemicals, medicines, food, biofuels, biodegradable polymers. Fermentation. Biotechnological assurance of continuity and quality of processes. Biotechnological processes in waste management, cellular localization of biodegradation processes. Bioindicators. Strategy for designing and obtaining a biotechnological product for the chemical industry. Production of a biotechnological product for various industries. Basic stages of biomass processing. Circular economy. Isolation and purification of a biotechnological product. Technology of microbiological preparations.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam	51.0%	100.0%

Recommended reading

Basic literature	Klimiuk E., Łebkowska M.: Biotechnologia w ochronie środowiska, PWN, 2005 Glick, B.R., Pasternak, J.J., Patten, C.L.: Molecular biotechnology: Principles and applications of recombinant DNA. ASM PRESS, 2009 Libudzisz Z., Kowal K., Żakowska Z.: Mikrobiologia techniczna, tom 2, PWN 2008 on-line resources
Supplementary literature	Olańczuk-Neyman K.: Laboratorium z biologii środowiska, Wyd. PG, 1998
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

test questions

diagram, problem question: obtaining a biotechnological product by molecular cloning, biogas, syngas, biofuels, biodegradable polymers

Work placement

Not applicable