University of Gdańsk

Subject card

Subject name and code	Basic techniques in molecular biotechnology, PG_00170561						
Field of study	Chemical Business, Chemistry						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2026/2027			
Education level	Bachelor's studies		Subject group	Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	3		Language of instruction	English			
Semester of study	6		ECTS credits	2.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Department of Molecular Biotechnology -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Daria Krefft					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15		5.0	35.0	55	
Subject objectives	1. Familiarization with basic techniques used in molecular biotechnology/biology. 2. Development of skills in applying procedures for working with genetically modified microorganisms. 3. Development of skills in planning and conducting an experiment in the field of molecular biotechnology/ biology.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[CHEML3_U02] Performs analyses using experimental methods and draws conclusions based on them.	Performs experiments as specified in the laboratory manual and discusses issues related to biotechnology and molecular biology in understandable, technical language.	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
[CHEML3_U03] Selects the appropriate equipment and laboratory apparatus for conducting uncomplicated chemical experiments.	Based on the laboratory instructions received, indicates the appropriate equipment necessary to carry out the planned experiments and is able to operate it.	[SU6] demonstration of practical skills [SU8] observation of student's independent or team work
[CHEML3_W04] Characterises the basic methods of chemical compound analysis.	Student is able to list and describe selected techniques used in the analysis of nucleic acids and proteins.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
[CHEML3_K05] Observes established procedures in laboratory work and is responsible for the safety of her/his and others' work.	The student is able to prepare the workstation, work aseptically, follows established research procedures and procedures for working with microorganisms (including GMM), and is careful when handling chemicals and materials of biological origin.	[SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[CHEML3_U06] Uses basic application software packages to solve problems from the field of science.	Performs basic bioinformatics analyses in DNA/protein analysis program according to received laboratory instructions.	[SU3] text preparation/written work [SU5] implementation of a problem task

Subject contents

Basic principles of work in a biotechnology laboratory. Isolation of plasmid DNA, digestion of DNA using restriction endonucleases. Electrophoresis of nucleic acids and proteins. PCR reaction. Isolation and purification of protein from a recombinant source on the example of *E. coli.*

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
homework	30.0%	20.0%
test	51.0%	80.0%

Recommended reading

Basic literature	1. B. R. Glick, J. J. Pasternak, C.I. Palten: Molecular biotechnology: Principles and applications of recombinant DNA. ASM PRESS, 2009 2. M. R. Green, J. Sambrook: Molecular Cloning: A Laboratory Manual, 4th edition, Cold Spring Harbor Laboratory Press, 2012 3. T. A. Brown: Genomy, PWN, 2019
Supplementary literature	1. J. Kur: Podstawy inżynierii genetycznej. Wydawnictwo Politechniki Gdańskiej, Gdańsk 1994 2. M. Sęktas: Zastosowanie inżynierii genetycznej w biotechnologii. Molekularne podstawy ekspresji genó. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2000
eResources addresses	

Example issues/ example questions/ tasks being completed	1. List the components of the reaction mixture necessary to perform the PCR reaction. 2. Describe the principle of protein analysis using SDS-PAGE electrophoresis. 3. Design primers that could be used to amplify a given gene (PCR reaction). 4. What dyes are used to visualize DNA in an agarose gel?
Work placement	Not applicable

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