University of Gdańsk

Subject card

Subject name and code	BIOPUZZLE, PG_00191612		
Field of study	Chemical Business		
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	Polish
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 Joanna Jeżewska-Frąckowiak	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	30.0	0.0	0.0	30

E-learning hours included: 0.0

Additional information:

tutoring and peer tutoring, flipped classroom, web-quest, design

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	30	4.0	26.0	60

Subject objectives

1. To familiarize students with molecular and IT techniques and tools in molecular biotechnology.
2. Teaching students to independently design a biotechnology experiment aimed at obtaining the final product.
3. Teaching students to independently conduct a biotechnology experiment.
4. Developing skills in documentation, processing and presentation of experimental results in the field of molecular biotechnology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BCHINŻ_U02] Uses basic methods, techniques and tools in formulating and solving engineering tasks in the field of chemistry.	The student plans a sequence of experiments focused on obtaining a final product with known properties.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] 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 basic tools of molecular biotechnology and the necessary ones computer software.	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BCHINŻ_U08] Uses the chemical nomenclature and engineering terminology properly.	The student presents the scheme and results of the experiments performed, comments on the obtained results independently.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[BCHINŻ_K03] Independently sets or implements a set action plan specifying priorities for its implementation; critically assesses its progress.	The student works in flipped-classroom mode, independently and in a group, developing a protocol for laboratory procedures.	[SK1] oral statement/conversation/ discussion [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[BCHINŻ_U03] Plans, selects the appropriate research and measuring equipment and performs simple chemical experiments; analyses the results and draws conclusions based on them.	The student uses computer software in process design obtaining a biotechnological molecular tool and independently operates the equipment in the biotechnology laboratory molecular.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
[BCHINŻ_K04] Demonstrates responsibility for the safety of her/ his own and others' work.	The student observes occupational health and safety rules in the laboratory molecular biotechnology.	[SK4] test/exam - oral or written [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
[BCHINŻ_U09] Using the acquired knowledge, skills and various sources of scientific information independently prepares written papers and oral presentations.	The student develops the results of experiments and presents his results in the form of a speech and a report.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[BCHINŻ_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	Carry out a multi-stage laboratory project working in a group.	[SK2] presentation/project/paper/ report [SK5] implementation of a problem task [SK6] demonstration of practical skills [SK8] observation of student's independent or team work

Subject contents

Molecular techniques and tools used in molecular biotechnology. Working with genetically modified microorganisms, preparation of microbiological media, genetic transformation, plasmid DNA. DNA purification, DNA amplification reaction, enzymatic hydrolysis of DNA, electrophoretic separation of DNA, measurement of DNA concentration.
Basic IT tools in biotechnological design. Biotechnology databases.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
computer simulation+enzymatic digestion+electrophoresis/ presentation/report	100.0%	12.25%
enzymatic digestion + electrophoresis/presentation/report	100.0%	12.25%
electrophoresis/presentation/report	100.0%	24.5%
purification of plasmid DNA, concentration determination/ presentation/report	100.0%	50.0%
preparation of media, genetic transformation / presentation / report	100.0%	1.0%

Recommended reading

Basic literature	online resources provided during the exercises webquest
Supplementary literature	Biochemia, Stryer L., PWN (nowsze) Zastosowanie inżynierii genetycznej w biotechnologii. Molekularne podstawy ekspresji genów., Sęktas A., WUG, Gdańsk (2000) Recombinant DNA. Genes and genomes a short course, Watson J.D., Cold Spring Harbour Laboratory Press (2007)

	eResources addresses	
Example issues/ example questions/ tasks being completed	genetic transformation, enzymatic digestion, electrophoresis, computer simulation	
Work placement	Not applicable	

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