

Subject card

Subject name and code	BIOPUZZLE, PG_00170790						
Field of study	Chemical Business						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
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	Laboratory of Bionanotechnology -> 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		6.0		24.0	60
Subject objectives	1. Familiarizing students with molecular & IT techniques and tools for 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_W07] Describes the construction and operating principles of basic scientific, technological and control-measuring apparatus.	The student knows the basic tools for molecular biotechnology and the applicable computer software.	[SW1] oral statement/ conversation/discussion [SW2] 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.	Carries 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
	[BCHINŻ_K04] Demonstrates responsibility for the safety of her/his own and others' work.	The student follows the health and safety rules in the laboratory of molecular biotechnology.	[SK4] test/exam - oral or written [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 for the design of biotechnology molecular tool production process and independently operates the equipment in the laboratory of molecular biotechnology.	[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_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, developing a protocol for laboratory procedures, independently and in a group.	[SK1] oral statement/conversation/ discussion [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
	[BCHINŻ_U08] Uses the chemical nomenclature and engineering terminology properly.	The student presents the scheme and results of the performed experiments, independently comments on the obtained results.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
	[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_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 it in the form of a speech and a written report.	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
Subject contents	Molecular techniques and tools used in molecular biotechnology. Working with genetically modified microorganisms, preparation of microbiological media, genetic transformation, plasmid DNA purification, DNA amplification reaction - PCR, enzymatic hydrolysis of DNA, electrophoretic separation of DNA, DNA concentration measurement. 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
	plasmid DNA purification, concentration measurement/ presentation/report	100.0%	20.0%
	enzymatic digestion + electrophoresis/presentation/report	100.0%	20.0%
	PCR reaction+ electrophoresis/ presentation/report	100.0%	20.0%
	computer simulation of electrophoresis after enzymatic digestion/presentation/report	100.0%	20.0%
	computer simulation of electrophoresis after PCR reaction/ presentation/report	100.0%	20.0%
	microbiological media preparation, genetic transformation / presentation / report	100.0%	0.0%
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, PCR, computer simulation	
Work placement	Not applicable	

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