University of Gdańsk

Subject card

Subject name and code	Application of genetic engineering in diagnostics, PG_00203467						
Field of study	Medical Biology						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2028/2029		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group Subject group related to scientific research 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		credit		
Conducting unit	Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Marian Sęktas				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	10.0	0.0	0.0	0.0	10
	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	10		2.0		13.0	25
Subject objectives	Presentation of diagnostic methods for genetic, microbiological and epidemiological diseases based on DNA and RNA using isothermal, alternative PCR techniques						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMEDL3_K01] is aware of the importance of lifelong learning and keeping up to date with developments in medical biology and related disciplines, and applies this knowledge to the planning and design of professional activities	understands the need for lifelong learning and updating knowledge in the field of medical biology and related disciplines, BM_K01	[SK8] observation of student's independent or team work
[BIOLMEDL3_U10] learns independently and in a focused manner, and is able to set priorities and organise the work of a small team, as well as work effectively within a team	is able to set priorities and organize the work of a small team and work effectively in a team BM_U14	[SU1] oral statement/conversation/ discussion [SU6] demonstration of practical skills
[BIOLMEDL3_W10] has an advanced understanding of the principles of assessing processes and phenomena occurring within the body, using physical or chemical measurements, and possesses advanced knowledge of experimental methods and the key techniques of the biological sciences that may be applied in medical biology and diagnostics	explains the theoretical foundations of experimental methods and lists the most important genetic engineering techniques that can be used in medical biology and diagnostics BM_W16	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
[BIOLMEDL3_U05] reads with understanding scientific texts in Polish and simple texts in English in the field of medical biology; independently searches and uses available sources of information, including electronic sources	reads with understanding scientific texts in Polish and simple texts in English in the field of genetic engineering; independently searches for and uses available sources of information, including electronic sources BM_U06	[SU1] oral statement/conversation/ discussion [SU8] observation of student's independent or team work
[BIOLMEDL3_U02] performs simple tasks or research expertise typical of medical biology under the guidance of a supervisor	under the supervision of a scientific supervisor performs simple tasks and research expert opinions in the field of genetic engineering BM_U03	[SU1] oral statement/conversation/ discussion [SU3] text preparation/written work [SU5] implementation of a problem task

Subject contents

Problems of auditorium exercises: selection of restriction enzymes for DNA analysis, DNA modifications using PCR methods, isothermal methods of DNA/RNA amplification for disease diagnostics and genotyping purposes.

Prerequisites and co-requisites

current lecture on the subject, knowledge of Microbiology, Biochemistry, Molecular Biology is required

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Evaluation of the correctness of the solution of DNA analysis problem tasks	51.0%	30.0%
Evaluation of the oral presentation of a given method according to the given criteria	51.0%	70.0%

Recommended reading

Basic literature	publications available in the PUBMED database (https://pubmed.ncbi.nlm.nih.gov) on isothermal DNA/RNA amplification methods
Supplementary literature	Marian Sęktas Zastosowanie inżynierii genetycznej w biotechnologii. Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2000
eResources addresses	

Example issues/ example questions/ tasks being completed

DNA ligation: Link the appropriate one of the given DNA fragments, after digestion with a restriction enzyme, with a vector cut with a restriction enzyme preserving complementary ends.

Propose a restriction analysis (ABCD enzymes) that would confirm the correct construction of the recombinant plasmid and the orientation of the insert.

Prepare a presentation of one of the contemporary method of isothermal DNA amplification (HDA, LCR, NASBA, LAMP or RPA) in a group of 5 people.

Work placement

Not applicable