

Subject card

Subject name and code	Molecular biology with biotechnology, PG_00154407						
Field of study	Biology						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2025/2026		
Education level	undergraduate studies		Subject group		Obligatory subject group in the field of study 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	2		Language of instruction		Polish Polish		
Semester of study	4		ECTS credits		3.0		
Learning profile	academic		Assessment form				
Conducting unit	Pracownia Biologii i Biotechnologii Bakteriofagów -> Katedra Biologii Molekularnej -> Faculty of Biology -> Rektor						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Bożena Nejman-Faleńczyk				
	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						
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		39.0	75
Subject objectives	Knowledge and understanding of the processes involved in the amplification, expression and modification of genetic material. Knowledge of various molecular biology techniques and the ability to use them in practice. Ability to work in a molecular biology laboratory using appropriate research tools and to analyze and interpret results.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLL3_W14] The graduate knows the theoretical basis of experimental methods and the most important techniques of the biological sciences	Has in-depth knowledge of the DNA amplification, expression, and construction of recombinant molecules. Explains the theoretical foundations and can apply in practice various techniques of molecular biology and genetic engineering.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BIOLL3_K03] The graduate will be able to organise the work of a small team and work effectively as part of a team	Is able to organize the work of a small team and demonstrates the ability to work effectively in it.	[SK1] oral statement/conversation/ discussion [SK8] observation of student's independent or team work
	[BIOLL3_U05] The graduate will be able to synthesise data from a variety of sources and draw appropriate conclusions	Describes experimental results, analyse data from various experiments, and draws appropriate conclusions from them.	[SU1] oral statement/conversation/ discussion [SU8] observation of student's independent or team work
	[BIOLL3_K06] The graduate is prepared to take responsibility for the equipment/materials entrusted to them and for their own work and that of others	Is responsible for the entrusted equipment, materials and own work and respects the work of others.	[SK8] observation of student's independent or team work
	[BIOLL3_W02] The graduate knows the structure and properties of biological macromolecules, the molecular mechanisms of basal metabolic pathways and genetic information flow and the sources of variation in organisms; the rules of inheritance	Has in-depth knowledge of the structure and function of bacteriophages. Describes the structure and properties of nucleic acids. Knows the mechanisms of processing and techniques of modifying genetic information in the form of DNA.	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion
	[BIOLL3_U02] The graduate will be able to make observations individually and in teams, and carry out basic physical, biological and chemical measurements in the field or laboratory	Has experience in conducting research and measurements in a biology laboratory both individually and in a team. Performs simple observations and measurements, and also analyzes the results of laboratory work in the field of molecular biology.	[SU8] observation of student's independent or team work
Subject contents	Basic techniques of phage DNA manipulation: DNA isolation, PCR gene amplification, use of restriction enzymes and ligases to construct recombinant DNA molecules. Use of prokaryotic protein expression systems. Transformation of bacterial strains with recombinant DNA. Preparation and morphological analysis of phage plaques.		
Prerequisites and co-requisites	Knowledge of chemistry and the ability to use it in the laboratory (preparation of solutions and buffers, concentration calculations, work safety). Knowledge of basic biochemical and molecular mechanisms occurring in prokaryotic cells.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	passing grades based on partial grades	51.0%	100.0%
Recommended reading	Basic literature	The instructions are original, based on original scientific publications and own experience in conducting research in the field of molecular biology.	
	Supplementary literature	- Węgleński P. Genetyka molekularna. PWN, Warszawa, 2008 - Turner P.C. i wsp. Biologia molekularna. Krótkie wykłady. PWN, Warszawa, 2007	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	DNA isolation, PCR technique, restriction enzymes, ligation reaction, DNA concentration measurement, DNA electrophoresis, competent cells, bacterial transformation, transformant analysis		
Work placement	Not applicable		

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