



## Subject card

Subject name and code	MOLECULAR BIOLOGY, PG_00048954						
Field of study	Green Technologies						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle 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	1	Language of instruction			English		
Semester of study	2	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Microbiology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Anna Brillowska-Dąbrowska				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60		15.0		50.0	125
Subject objectives	Knowledge of various techniques of molecular biology and the ability to use them in practice. Independent and group ability to work in a molecular biology laboratory with the use of appropriate research tools as well as the analysis and processing of results.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W01] a broader and deeper knowledge of certain branches of mathematics, including elements of applied mathematics and optimization methods including mathematical methods, useful to formulate and solve complex tasks in the field of environmental technologies and modern analytical methods	The student is able to apply knowledge from other areas in molecular biology			[SW1] Assessment of factual knowledge		
	[K7_U05] can formulate and test hypotheses related to the problems of engineering and simple research problems relating to the protection of the environment, new environmental technologies and analytical procedures	The student defines the basic concepts of molecular biology. Explains the central dogma of molecular biology. Acquires knowledge of DNA replication, genome structure and functions, basic mechanisms responsible for the transfer of genetic information and regulation of gene expression, DNA damage and repair.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject		
[K7_W03] will have a detailed knowledge of the theoretical basis of methods and types of apparatus used in chemical analysis of environmental pollutants and the technology of cleaning and neutralization of industrial waste and wastewater management and the design and supervision of environmentally friendly technologies	Student can use basic techniques and methods applied in molecular biology laboratory.			[SW1] Assessment of factual knowledge			

Subject contents	Introduction to molecular biology. Molecular biology dogma (basic concepts - gene, genotype, phenotype, nucleic acids, replication, transcription, translation; Crick's concept of the "central dogma of molecular biology"; the origin of the genetic code. Structure and characteristics of nucleic acids (DNA and RNA). DNA replication (basic rules of the replication process - initiation, elongation and termination) Proteins involved in the process Molecular mechanism of mutation and DNA repair (types of mutations, molecular basis of mutations; mutagens, DNA repair mechanism) Transcription in Prokaryotes Diversity of RNA structure and function (types of RNA acid ; ribosome structure; transfer RNA; messenger RNA) Mechanism of transcription (fundamental differences in the transcription process in Prokaryota and Eukaryota) Translation (molecular mechanism of translation - initiation, elongation, termination) Basic terms: codon, anticodon, ribosome, tRNA as a molecule acceptor, structure of tRNA. Aminoacyl-tRNA synthetase, principle of tolerance, initiation, e translation longation and termination, protein translation factors. Enzymes. Molecular biology techniques.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratories	60.0%	40.0%
	Test 2	60.0%	30.0%
	Test 1	60.0%	30.0%
Recommended reading	Basic literature	Molecular Cloning: A Laboratory Manual, 3rd ed., Vols 1,2 and 3 - J.F. Sambrook and D.W. Russell, ed., Cold Spring Harbor Laboratory Press, 2001	
	Supplementary literature	Publications in scientific journals provided by teacher	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Central dogma of molecular biology		
Work placement	Not applicable		