University of Gdańsk

Subject card

Subject name and code	Molecular biology of nucleic acids, PG_00153604		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's 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	Polish
Semester of study	1	ECTS credits	3.0
Learning profile	academic	Assessment form	exam
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Igor Konieczny	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	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	5.0	40.0	75

Subject objectives

The aim of the course is understanding the molecular basis of metabolism of nucleic acids, acquire knowledge allowing to interpret and analyze the results of contemporary research concerning nucleic acids. Get acquainted with complex issues of biology of nucleic acids and the significance of these processes in biotechnology. Students will acquire knowledge concerning the newest research on nucleic acids and will perfect their English to the extent that will allow them to understand utterances and read, with understanding, scientific literature concerning molecular biology of nucleic acids.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W01] The graduate has in-depth knowledge of complex biological phenomena at the molecular level and knows their importance for biotechnology, is able to analyze them in an interdisciplinary approach and assess their ethical, social and environmental implications.	Understanding of complex issues of molecular biology of nucleic acids	[SW4] test/exam - oral or written [SW5] implementation of a problem task
[BIOTECHMU2_U05] The graduate has proficient knowledge of English to understand statements and read and understand literature and scientific studies in the fields of science and scientific disciplines relevant to biotechnology; is able to prepare a written study and an oral presentation in English.	English language skills alowing understanding of issues conected with molecular biology of nucleic acids	[SU4] test/exam - oral or written
[BIOTECHMU2_W04] The graduate has in-depth knowledge of selected biotechnology problems currently discussed in the literature.	Knowlage of molecular biology of nucleic acids	[SW4] test/exam - oral or written

Subject contents	• History of research on metabolism of nucleic acids - key experiments • Notions of replicon and operon • DNA replication initiation in bacterial chromosomes and extrachromosomal genetic elements • DNA replication initiation in eukaryotic cells • Structure of Rep proteins • Helicases - structure, the role in the process of DNA replication • Primosom complex - synthesis of DNA replication starters • RNA and DNA dependent polymerases - structure, properties, molecular basis of the synthesis of nuclear acids • Structure of the E. coli Pol III holoenzyme complex • Mechanism of synthesis of leading and lagging strands in prokaryotic and eukaryotic cells • DNA repair - kinds of DNA repair, enzymes taking part in repair • Topology and dynamics of chromosomes and extrachromosomal genetic elements • Mobile genetic elements • Molecular basis of transposition process
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Knowlage	50.0%	30.0%
Understanding	50.0%	45.0%
Engish	50.0%	25.0%

Recommended reading	Basic literature	Genes by Benjamin Levin Molecular Biology of the Cell by Alberts at all Molecular Biology of Nucleic Acid Węgrzyn and Konieczny
	Supplementary literature	Essential cell biology by Bruce Alberts at all
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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