University of Gdańsk

Subject card

Subject name and code	Biomolecules - Methods, PG_00196901		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Katarzyna Węgrzyn	
	Teachers		

Lesson types

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

Seminars aims to provide advanced knowledge about the structure and properties of biomolecules e.g., proteins, nucleic acids, sugars, and lipids) forming more complex biological systems, cellular compartments. The student will acquire practical skills related to preparing presentations on methods of biomolecule isolation, and their biochemical, biophysical, and bioinformatic analysis. During the classes, students will discuss methods in terms of their application in the analysis of biomolecules derived from viruses, prokaryotic cells, and eukaryotic cells.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHL3_U04] The graduate is able to search for, analyse and use scientific information, also in English, in the field of biotechnology in the fields of exact and natural sciences and medical and health sciences; uses electronic sources; has advanced skills in using appropriate databases.	Student is able to prepare and present presentations on methods of biomolecule isolation, their biochemical, biophysical, and bioinformatics analysis. The student is able to discuss methods in terms of their application in the analysis of biomolecules, with particular emphasis on bacteria and extrachromosomal genetic elements (group 1), eukaryotic animal cells (group 2), viruses (group 3), Gram-positive bacteria (group 4), or prokaryotic and eukaryotic plant cells (group 5).	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU5] implementation of a problem task

Subject contents	

Seminar Group Selection

Group 1

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The mentioned methods will be discussed with examples from the fields of bacterial biochemistry and molecular biology, with particular emphasis on extrachromosomal genetic elements.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 2

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The classes will cover the following topics, with a focus on animal eukaryotic cells as a research model.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 3

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The mentioned methods will be discussed with examples from the fields of molecular biology and virology.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 4

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The mentioned methods will be discussed with examples from the fields of bacterial biochemistry and molecular biology, including Gram-positive bacteria.

- methods of nucleic acid isolation
- electrophoretic methods in nucleic acid analysis
- PCR
- DNA and protein sequencing
- protein purification methods
- electrophoretic methods in protein analysis
- expression systems
- methods of labeling and modification of nucleic acids and proteins
- methods for detection of nucleic acids and proteins

Group 5

The program includes topics related to methods of genetic engineering, description of methods, principles of application, stages of laboratory procedures, and their theoretical foundations. The classes will cover the following topics, with a focus on prokaryotic cells and plant eukaryotic cells as research models.

- methods of nucleic acid isolation

<table>
<tr><td></td><td>• electrophoretic methods in nucleic acid analysis
• PCR
• DNA and protein sequencing
• protein purification methods
• electrophoretic methods in protein analysis
• expression systems
• methods of labeling and modification of nucleic acids and proteins
• methods for detection of nucleic acids and proteins
This course includes CGT-related training content, contributing to the Talent-CGT project under the EIT HEI initiative. It is supported by the European Institute of Innovation & Technology (EIT), a body of the European Union.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Test+Activity+Presentations</td><td>51.0%</td><td>100.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Molecular Cloning - A Laboratory Manual by Sambrook, Fritsch, and Maniatis

Molecular Cloning - A Laboratory Manual, 4th Edition (2012) by Green, Sambrook

Materials prepared by the teacher</td></tr>
<tr><td>Supplementary literature</td><td>Materials independently searched for and selected by students for the classes using library resources and electronic information sources</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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