University of Gdańsk

Subject card

Subject name and code	Bioinformatics - applications , PG_00153620		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	postgraduate studies	Subject group	Obligatory subject group 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	2.0
Learning profile	academic	Assessment form	
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rektor		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Małgorzata Waleron	
	Teachers	dr hab. Małgorzata Waleron	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	5.0	30.0	50

Subject objectives

Getting students acquainted with the basic knowledge in the area of bioinformatics that allows students to consciously use bioinformatics methods and tools applied in biotechnology and other fields of science.

Students will widen their knowledge in the related areas and disciplines of science that will allow them to see relationships and dependencies in nature, in particular those essential for biotechnology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W02] The graduate knows and understands the use of laboratory techniques and methods of genetic modification of cells and organisms and their use in biotechnology	The student has an extended knowledge of the performance and interpretation of bioinformatics analyses and their use in biotechnology.	[SW4] test/exam - oral or written
[BIOTECHMU2_W05] The graduate knows and understands the methods used in science and natural sciences necessary to understand biological phenomena and processes at the molecular level	The student has knowledge in the field of mathematical methods, including statistical ones, applied in biotechnology.	[SW4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>1. Review of sequential databases. Collection, storage and preparation of sequences to be deposited in public databases.
2. Sequence comparison (comparison of pairs of sequences, comparison of many sequences).
3. Search for similar sequences in databases.
4. Chimeric sequences. OTU (operational taxonomic units) determination, Metagenomics
5. Genomics and projects of genome sequencing
6. Genome assembly and annotation
7. Comparative genomics. Phylogenetic profiles and regions of genome plasticity.
8. Pangenomics. Pangenome, core genome and dispensable genes discrimination.
9. Overall Genome Related Index (OGRI) methods: ANI/AAI, DNA-DNA hybridisation in silico.
10. Phylogenetics . Evolution models. Phylogenetic prediction
11. Searching for the gene clusters encoding secondary metabolites
12. Searching for plasmids, prophages, mobile genetic elements in NGS data</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Unicellular organisms - Structure, diversity and environment Fundaments (M03_B1)

Unicellular organisms - Genetics Methodology (M03_B2)

Unicellular organisms - Genetics Metabolism (M03_B3)</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>Graded test with open questions</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>• Applied Bioinformatics : An Introduction, Paperback by Selzer, Paul M. (EDT) Springer 2018
• Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins (Methods of Biochemical Analysis
• Bioinformatics and Molecular Evolution. Paul G. Higgs, Teresa K. Attwood.</td></tr>
<tr><td>Supplementary literature</td><td>• Bioinformatics. Sequence and genome analysis". D.W. Mount. 2001.
• Students individually search for materials concerning classes using electronic resources</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<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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