Subject card

Subject name and code	Bioinformatics in diagnostics, PG_00147787		
Field of study	Genetics and Experimental Biology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	undergraduate 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	3	Language of instruction	Polish Polish
Semester of study	6	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Pracownia Ewolucji Molekularnej i Bioinformatyki -> Katedra Genetyki Ewolucyjnej i Biosystematyki -> Faculty of Biology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Marek Ziętara	
	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	3.0	17.0	50

Subject objectives	The aim of the course is to familiarize students with advanced bioinformatics tools, with the techniques of molecular phylogenetics, with elements of structural bioinformatics and with the basics of genomics

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GBEL3_W08] information technology applied in genetics and experimental biology.	Knows the principles of operation of bioinformatic analysis programs and selected methods of construction and interpretation of phylogenetic trees based on DNA and protein sequences.	[SW4] test/exam - oral or written
[GBEL3_W01] Understanding the structure and properties of basic types of biological macromolecules, molecular mechanisms of metabolic pathways and genetic information flow, as well as sources of genetic variability in organisms and mechanisms of evolution; explaining the rules of inheritance, elucidating differences in the structure and functioning of prokaryotic and eukaryotic cells, and understanding the structure and functional relationships at the cellular and tissue levels.	It describes the structure and properties of macromolecules, as well as explains the rules of their inheritance. He knows the principles of evolution sequences, structure and function of DNA.	[SW4] test/exam - oral or written

Subject contents	Lecture: Molecular evolution in bioinformatics terms. Discussion of phylogenetic relationships of diagnosed taxa in the selected research model. Characteristics and interpretation of phylogenetic trees (discussion of the reliability of tree topology, the phenomenon of gene duplication - orthologs and paralogues, the phenomenon of incomplete sorting of phylogenetic lines, the phenomenon of attraction of long branches, hybridization, the problem of the outer group). The issue of the molecular clock. Selected RNA/protein structures. Discussion and comparison of genomes in the selected research model.

<table>
<tr><td>Prerequisites
and co-requisites</td><td colspan="2">formal requirements: passing the Bioinformatics exercises in diagnostics before admission to the exam.
prerequisites: Knowledge and skills in Fundamentals of Bioinformatics.
additional requirements:
1. The student is obliged to participate in classes, and in the event of absence, it must be excused in accordance with paragraph 12 of the UG Study Regulations. 2. The condition for passing the lecture is attendance at least 80% of classes. 3. The student is obliged to fill in the gaps in knowledge and skills caused by the absence from lectures on his/her own, while the gaps in knowledge and skills caused by the absence from the classes in the manner and on the date indicated by the Lecturer.</td></tr>
<tr><td>Assessment methods
and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam</td><td>51.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>A. Literature required for the final passing of the course (passing the exam):A.1. used during classes
Jin Xiong. Podstawy bioinformatyki. Wydawnictwa Uniwersytetu Warszawskiego
A.2. studied by the student on his or her own
Barry G. Hall Łatwe drzewa filogenetyczne. Wydawnictwa Uniwersytetu Warszawskiego
scientific articles indicated by the lecturer</td></tr>
<tr><td>Supplementary literature</td><td>B. Supplementary literature
Baxevanis A.D., Ouellette B.F. (red.) (2005) Bioinformatyka - podręcznik do analizy genów i białek. PWN, ISBN 83-01-142111
Paul G. Higgs, Teresa K. Attwood (2008) Bioinformatyka i ewolucja molekularna. PWN, ISBN: 978-83-01-15494-3</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/
example questions/
tasks being completed</td><td colspan="2">Not applicable</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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