University of Gdańsk

# Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Bioinformatics and Molecular Modeling_Lecture, PG_00099386 | | |
| Field of study | Bioinformatyka i Modelowanie Molekularne - wykład (Wykład) | | |
| Date of commencement of studies | October 2024 | Academic year of realisation of subject | 2025/2026 |
| Education level | Master's studies | Subject group | |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | English |
| Semester of study | 3 | ECTS credits | 1.0 |
| Learning profile | academic | Assessment form | exam |
| Conducting unit | Intercollegiate Faculty of Biotechnology UG-MUG -> Rector | | |
| 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 | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 | 10 |

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 13063 ATC-WOiG-MIX-MSU2DZ-(2025-2026)_Marine_Biotechnology_Exercises_ Bioinformatics_and_molecular_modelling_X2025
https://mdl.ug.edu.pl/course/view.php?id=13063

**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 | 10 | 0.0 | 0.0 | 10 |

**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 marine 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 marine biotechnology.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [MBMU2-KW04] Knows and deeply understands advanced research methods used in marine biotechnology and related sciences | The student has knowledge in the field of bioinformatic methods applied in marine biotechnology. The student has an extended knowledge of the interpretation of bioinformatics analyses and their use in marine biotechnology | [SW4] test/egzamin - ustny lub pisemny |

<table>
<tr><td>Subject contents</td><td>1. Review of sequence databases. Collection, storage and preparation of sequences to be deposited in public databases.<br>2. Sequence comparison (comparison of pairs of sequences, comparison of many sequences).<br>3. Search for similar sequences in databases.<br>4. Chimeric sequences. OTU (operational taxonomic units) determination, Metagenomics<br>5. Genomics and projects of genome sequencing<br>6. Genome assembly and annotation<br>7. Comparative genomics. Phylogenetic profiles and regions of genome plasticity.<br>8. Pangenomics. Pangenome, core genome and dispensable genes discrimination.<br>9. Overall Genome Related Index (OGRI) methods: ANI/AAI, DNA-DNA hybridisation in silico.<br>10. Phylogenetics . Evolution models. Phylogenetic prediction<br>11. Searching for the gene clusters encoding secondary metabolites<br>12. Searching for plasmids, prophages, mobile genetic elements in NGS data.<br>13. Predicting the 3D structure of a protein based on its amino acid sequence using the AlphaFold Protein Structure Database.</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>The theoretical knowledge acquired during the course will be verified by means of a written examination.</td><td>51.0%</td><td>100.0%</td></tr>
</table></td></tr>
<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<br>Bioinformatics. A Practical Guide to the Analysis of Genes and Proteins. A.D. Baxevanis, B.F.F. Ouellette. 1998<br>Bioinformatics and Molecular Evolution. Paul G. Higgs, Teresa K.Attwood. 2004</td></tr>
<tr><td>Supplementary literature</td><td>• Bioinformatics. Sequence and genome analysis". D.W. Mount. 2001.<br>• Students individually search for materials concerning classes using electronic resources.</td></tr>
<tr><td>eResources addresses</td><td></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>
</table>

Document generated electronically. Does not require a seal or signature.