

## Subject card

|                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                          |                                                                                                                                                                                            |                                     |                                                |            |     |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|------------|-----|
| Subject name and code                       | Bioinformatics for biologists, PG_00132656                                                                                                                                                                                                                                                                                                                                                                                                             |                                                          |                                                                                                                                                                                            |                                     |                                                |            |     |
| Field of study                              | Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                          |                                                                                                                                                                                            |                                     |                                                |            |     |
| Date of commencement of studies             | October 2025                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                          | Academic year of realisation of subject                                                                                                                                                    |                                     | 2027/2028                                      |            |     |
| Education level                             | Bachelor's 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                                         |            |     |
| Semester of study                           | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                          | ECTS credits                                                                                                                                                                               |                                     | 1.0                                            |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                          | Assessment form                                                                                                                                                                            |                                     | credit                                         |            |     |
| Conducting unit                             | Laboratory of Molecular Evolution and Bioinformatics -> Department of Evolutionary Genetics and Biosystematics -> Faculty of Biology -> Rector                                                                                                                                                                                                                                                                                                         |                                                          |                                                                                                                                                                                            |                                     |                                                |            |     |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                  | 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                                                       |                                                                                                                                                                                            | 2.0                                 |                                                | 8.0        | 25  |
| Subject objectives                          | To introduce students to advanced bioinformatics tools for the basics: molecular phylogenetics, structural bioinformatics, genomics and proteomics, and genetic variation analysis.                                                                                                                                                                                                                                                                    |                                                          |                                                                                                                                                                                            |                                     |                                                |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                          | Subject outcome                                                                                                                                                                            |                                     | Method of verification                         |            |     |
|                                             | [BIOLL3_W12] The graduate knows and understands the principles of using IT tools for data analysis and interpretation of natural phenomena and processes                                                                                                                                                                                                                                                                                               |                                                          | The student knows the principles of analysis of the structure and function of DNA and proteins.                                                                                            |                                     | [SW4] test/exam - oral or written              |            |     |
|                                             | [BIOLL3_W11] The graduate knows the methods of statistical analysis and their importance in the interpretation of phenomena and processes                                                                                                                                                                                                                                                                                                              |                                                          | The student has knowledge of the operation of programs for bioinformatic analyses and methods of construction and interpretation of phylogenetic trees based on DNA and protein sequences. |                                     | [SW4] test/exam - oral or written              |            |     |
| Subject contents                            | Introduction to biological databases. Sequence comparison. Models of DNA substitution. Introduction to molecular phylogenetics. Construction of phylogenetic trees on a selected research model - methods and programs. The principle of the molecular clock. Predicting genes and promoters. Structural bioinformatics. Mapping, assembling and comparing genomes. Introduction to functional genomics and proteomics. Analysis of genetic variation. |                                                          |                                                                                                                                                                                            |                                     |                                                |            |     |

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| Prerequisites and co-requisites | formal requirements: passing Bioinformatics exercises for biologists before admission to the exam.                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                       |                               |
|                                 | 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.                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                       |                               |
| Assessment methods and criteria | 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. |                                                                                                                                                                                                                                                                                                                                                                                       |                               |
|                                 | Subject passing criteria                                                                                                                                                                                                                                         | Passing threshold                                                                                                                                                                                                                                                                                                                                                                     | Percentage of the final grade |
|                                 | Written test                                                                                                                                                                                                                                                     | 51.0%                                                                                                                                                                                                                                                                                                                                                                                 | 100.0%                        |
| Recommended reading             | Basic literature                                                                                                                                                                                                                                                 | A. Literature required for the final credit of the course:A1. used during classes: Jin Xiong, Podstawy bioinformatyki. Wydawnictwo Uniwersytetu WarszawskiegoA2. Self-studied by the student: Barry G. Hall Łatwe drzewa filogenetyczne. Wydawnitwo Uniwersytetu Warszawskiego                                                                                                        |                               |
|                                 | Supplementary literature                                                                                                                                                                                                                                         | B. Supplementary literature: <ul style="list-style-type: none"><li>• Baxevanis A.D., Oullette B.F. (red.) (2005) Bioinformatyka - podręcznik do analizy genów i białek. PWN, ISBN 83-01-142111</li><li>• Paul G. Higgs, Teresa K. Attwood (2008) Bioinformatyka i ewolucja molekularna. PWN, ISBN 978-83-01-15494-3</li><li>• scientific articles indicated by the lecturer</li></ul> |                               |
|                                 | eResources addresses                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                       |                               |
|                                 | Example issues/<br>example questions/<br>tasks being completed                                                                                                                                                                                                   | No applicable                                                                                                                                                                                                                                                                                                                                                                         |                               |
| Work placement                  | Not applicable                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                       |                               |

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