Bioinformatic data analysis
Educational subject description sheet

Basic information

Study programme Biotechnology	**Didactic cycle** 2024/25
Speciality -	**Subject code** 01BTES.22N.15703.24
Organizational unit Faculty of Biology	**Lecture languages** English
Study level Second-cycle programme	**Course type** Elective
Study form Full-time	**Block** Subjects not assigned
Education profile General academic	

Subject coordinator	Marek Żywicki

Lecturer	Marek Żywicki

Period Semester 2	**Activities and hours** • Classes: 15, Graded credit	**Number of ECTS points** 2

Goals

Code	Goal
C1	Teach students how to plan and perform a complete bioinformatic study of a biological problem
C2	Familiarize students with methods of group work organization

Subject learning outcomes

Code	Outcomes in terms of	Learning outcomes	Examination methods
Knowledge – Student:			
W1	know the critical steps of the bioinformatic project.	BTY_K2_W05, BTY_K2_W06	Project
W2	knows the public repositories of biological data and bioinformatic tools necessary for their interpretation.	BTY_K2_W01, BTY_K2_W05	Project
Skills – Student:			
U1	can use publicly available biological data for investigation of biological problem.	BTY_K2_U01, BTY_K2_U03, BTY_K2_U06	Project
U2	can interpret and discuss the results of bioinformatic analysis of biological data.	BTY_K2_U01, BTY_K2_U03, BTY_K2_U04, BTY_K2_U06, BTY_K2_U07	Project
Social competences – Student:			
K1	is ready for critical selection of publicly available biological data.	BTY_K2_K01, BTY_K2_K02	Project

Study content

No.	Course content	Subject learning outcomes	Activities
1.	Planing of the bioinformatic research project aimed for characterization of a given biological process.	W1	Classes
2.	Public resources for biological data aquisition and analysis.	W2, U1, K1	Classes
3.	Bioinformatic analysis of biological data to solve the selected biological problem.	U1, U2, K1	Classes

Additional information

Activities	Teaching and learning methods and activities
Classes	Problem-based learning, Project method

Activities	Credit conditions
Classes	To complete the course, students have to plan and perform the biological data analysis project, which on last meeting will be presented to the class. Grades will be assigned based on: accordance of employed data sources and analysis methods to the research question (60% of the grade) complexity of the data analysis (30% of the grade) activity in discussion during the classes (10 % of the grade)

Literature

Obligatory

1. Oza VH, Whitlock JH, Wilk EJ, Uno-Antonison A, Wilk B, et al. (2023) Ten simple rules for using public biological data for your research. PLOS Computational Biology 19(1): e1010749. https://doi.org/10.1371/journal.pcbi.1010749

Optional

1. Sielemann K, Hafner A, Pucker B. 2020. The reuse of public datasets in the life sciences: potential risks and rewards. PeerJ 8:e9954 https://doi.org/10.7717/peerj.9954

Calculation of ECTS points

Activities	Activity hours*
Classes	15
Preparation of a project	25
Report preparation	5
Preparation for classes	10
Student workload	**Hours** 55
Number of ECTS points	**ECTS** 2

* academic hour = 45 minutes

Efekty uczenia się dla kierunku

Kod	Treść
BTY_K2_K01	The graduate is ready to critically assess knowledge and use it in solving research and technological problems
BTY_K2_K02	The graduate is ready to improve and update their knowledge of biotechnology and related areas of study
BTY_K2_U01	The graduate can independently select and use the tools and methods for solving research and technological problems, and act based on state-of-the-art findings of science, including medical biotechnology
BTY_K2_U03	The graduate can creatively utilize and update their knowledge of biotechnology – identify, formulate, and solve research problems, conduct critical analysis and selection of information coming from publicly available sources
BTY_K2_U04	The graduate can present and review different opinions and positions, and moderate a discussion on the subject of biotechnology and related disciplines as well as interdisciplinary subjects, while complying with applicable laws and norms of ethics
BTY_K2_U06	The graduate can organize teamwork and cooperate with other individuals assuming various roles within the group
BTY_K2_U07	The graduate can design their self-education, improve professional competence, and advise other individuals on their education
BTY_K2_W01	The graduate knows and understands up-to-date research technology that provides solutions to innovative problems on the verge of technology and contemporary biology/medicine
BTY_K2_W05	The graduate knows and understands advanced tools of statistics and bioinformatics which are indispensable in designing/performing experiments and in the interpretation of the results
BTY_K2_W06	The graduate knows and understands rules of designing and testing therapeutic solutions based on recent findings of natural sciences and other sciences, including biotechnology