University of Gdańsk

Subject card

Subject name and code	Biological data visualization, PG_00207356		
Field of study	Biology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group Subject group related to scientific research 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	credit
Conducting unit	Centrum Genomiki i Bioinformatyki Stosowanej -> Faculty of Biology -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Marcin Jąkalski	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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	5.0	15.0	50

Subject objectives	- Familiarizing students with various types of biological data visualization and visualization generation tools - Preparing students to create professional illustrations ready for including in theses, presentations, scientific posters, and scientific publications

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOLMU2_W07] knows specialized bioinformatics tools, useful in solving problems in the studied speciality of biological sciences	the graduate is familiar with specialised bioinformatics tools, useful in solving problems of the studied specialisation of biological sciences	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
[BIOLMU2_U01] is able to select and apply research techniques and tools appropriate to the problems of the studied speciality of biological sciences	the graduate is able to select and apply research techniques and tools appropriate to the problems of the biological sciences specialisation studied	[SU1] oral statement/conversation/ discussion
[BIOLMU2_K03] is ready to defined priorities for the implementation of tasks specified by him/herself or others	the graduate is ready to identify priorities in order to accomplish a task defined by him/herself or by others	[SK1] oral statement/conversation/ discussion [SK8] observation of student's independent or team work
[BIOLMU2_U08] is able to present research works in the field of a chosen specialization of biological sciences using verbal communication and multimedia tools and conduct substantive discussions with specialists on topics related to biological issues	the graduate is able to present research work in the field of the selected specialisation of biological sciences using verbal communication means and multimedia	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task
[BIOLMU2_U03] is able to critically analyze and select biological information, especially from electronic sources	the graduate can critically analyse and select biological information, especially from electronic sources	[SU5] implementation of a problem task [SU8] observation of student's independent or team work

Subject contents

1. Generating basic chart types (box plot, violin plot, histogram, scatter plot, bar chart, pie chart)

2. R language and selected graphics packages

3. UpSet chart

4. Principal component analysis (PCA) chart

5. Phylogenetic visualizations (iTol tool)

6. Heatmaps with annotations

7. Genomic visualizations (Manhattan plot, GWAS data visualization, genomic browsers)

8. Visualization of protein and nucleic acid structures

9. Circos plots

10. Inkscape and vector graphics

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
completing assignments	51.0%	40.0%
completing worksheets	51.0%	60.0%

Recommended reading	Basic literature	A.1. used during classes Documentation for selected graphics packages and programs indicated by the instructor (online resources) A.2. Studying independently by the student P. Biecek 2017. Przewodnik po pakiecie R. Oficyna Wydawnicza GiS. W. Chang 2012. R Graphics Cookbook. OReilly Media JP Lander 2018. Język R dla każdego Zaawansowane analizy i grafika statystyczna. APN Promise.
	Supplementary literature	K Cieśla 2021. Inkscape Podstawowa obsługa programu. Wydawnictwo Helion..
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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