

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 Jąkałski				
	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_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
	[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
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 worksheets	51.0%	60.0%
	completing assignments	51.0%	40.0%

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. O'Reilly 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	

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