University of Gdańsk

Subject card

Subject name and code	Programming basics for biologists, PG_00207348						
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							
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	- The course introduces the basics of programming and biological data analysis to biology students, by utilization of Linux, the Bash shell, and the R language. - Students work with biological data and learn how to load, process, filter the data, perform basic statistical analysis, and how to visualize it.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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_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_W06] knows statistical tools appropriate to the problems of the studied speciality of biological sciences	the graduate is familiar with advanced statistical tools relevant to the problems of the biological sciences specialisation studied	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
[BIOLMU2_W03] has thorough knowledge and understanding of research problems at the border of biological sciences that require the use of advanced tools	the graduate has an in-depth knowledge and understanding of research problems at the frontiers of biological sciences that require the use of advanced tools	[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	[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_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. Linux basics

2. Working with the terminal, Bash commands and scripts

3. Introduction to R and RStudio

4. Data types, variable declaration, functions

5. Loading biological data, data structure, working with files

6. Descriptive statistics, basic statistical tests

7. Basics of biological data visualization in R

8. Creating documents/reports with R Markdown

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	R project website, http://www.r-project.org/
	P. Biecek 2017. Przewodnik po pakiecie R. Oficyna Wydawnicza GiS.

	Supplementary literature	W Hadley, G Garret 2021 Język R. Kompletny zestaw narzędzi dla analityków danych. Wydawnictwo Helion. W E Shotts 2024 The Linux Command Line, 6th Edition
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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