University of Gdańsk

Subject card

Subject name and code	Statistics in biotechnology 2, PG_00153632		
Field of study	Biotechnology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
Education level	Master'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	1	Language of instruction	Polish The course can be taught in English.
Semester of study	2	ECTS credits	2.0
Learning profile	academic	Assessment form	
Conducting unit	Intercollegiate Faculty of Biotechnology UG-MUG -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Adam Iwanicki	
	Teachers	dr hab. Adam Iwanicki	

Lesson types

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

Subject objectives

The aim of the course is to teach students how to analyze experimental data using statistical methods with help of such programs as MS Excel or Past.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BIOTECHMU2_W05] The graduate knows and understands the methods used in science and natural sciences necessary to understand biological phenomena and processes at the molecular level	Student knows statistical methods of analysis of experimental data that can help in solving asked research questions.	[SW5] implementation of a problem task
[BIOTECHMU2_U03] The graduate is able to work independently and in a team; be flexible when working in a team and accept various roles and tasks, including the role of a group leader	Student is capable of working independently and as a member of a team accordingly to a assigned role.	[SU8] observation of student's independent or team work
[BIOTECHMU2_U02] The graduate is able to collect and interpret empirical data; use statistical methods and IT tools in data analysis; formulate conclusions based on empirical data	Student is capable of performing a statistical analysis of experimental data. Student is capable of making inference based on results of statistical tests.	[SU5] implementation of a problem task

Subject contents	1. Proper planning of an experiment. 2. Preparation of experimental data to statistical analysis. 3. Selection of appropriate method of graphical presentation of experimental data. 4. Verification of statistical hypotheses. Calculation of statistical power. 5. Introduction to linear models. 6. Parametric and non-parametric analysis of variance. 7. Linear regression analysis with selection of contributing explanatory variables
Prerequisites and co-requisites	Statistics or equivalent

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Content of the course	51.0%	100.0%

Recommended reading

Basic literature	1. Robert R. Sokal F. "Introduction to biostatistics", Dover Publications 2. A course prepared in Portal Edukacyjny UG
Supplementary literature	N/A
eResources addresses	Podstawowe https://www.nature.com/collections/qghhqm/pointsofsignificance - A collection of articles about analysis of experimental data (accessed: 12.06.2024) https://biostathandbook.com/ - A handbook of statistical analysis of biological data (accessed: 12.06.2024) Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

1. What kind of variables can be identified in the experiment in which we analyzed expression of *dnaA* gene in *E. coli* cells in different growth phases.

2. Plan an experiment in which we would like to analyze efficiency of apoptosis induction in HeLa cells treated with doxorubicin. Ask a biological question, make biological and statistical hypotheses, propose methods of statistical analysis of obtained results.

3. Use appropriate statistical test to analyze data coming form experiment in which we tested influence of UV of *S. aureus* cells, according to provided results. Remember about making statistical hypotheses and interpreting results of performed statistical test.

Work placement	Not applicable

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