GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biostatistics, PG_00058419		
Field of study	Biotechnology		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-cycle studies	Subject group	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 no comments
Semester of study	2	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Microbiology -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Anna Stanisławska-Sachadyn	
	Teachers	dr hab. inż. Anna Stanisławska-Sachadyn	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	15.0	0.0	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	2.0	8.0	25

Subject objectives

The aim of the biostatistics course is to present practical tools in the field of analysis of biological and biomedical variables using Excel and SAS (North Carolina, USA). The student acquires the skills necessary for designing and conducting scientific experiments and conducting research in the field of biotechnology, which is one of the objectives of education in the second cycle of the Biotechnology field. The subject deepens the student's bioinformatics knowledge. The student gains the ability to apply knowledge in the field of biostatistics.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U09] is able to design experiments and analyze experimental results, is able to prepare and present papers, reports, documentation of experiments, technological processes using correct scientific and specialist terminology, and to prepare a correct bibliography	The student is able to design experiments and analyze experimental results. The student is able to select the appropriate statistical test to interpret the variables obtained as a result of the experiment.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[K7_W01] has advanced knowledge of methods of genetic engineering and molecular genetics, functioning of the immune system and mechanisms of immune system response, diagnostic methods, and analytical methods in the area of specialty	Knowledge in the field of genetic engineering and molecular genetics, the functioning of the immune system and immune system response mechanisms, diagnostic and analytical methods is deepened with statistical analyses.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K7_K02] is aware of the limitations and the necessity of continuous development of knowledge and technology; understands the need for education and constant training	The student is aware of the limitations, but also of the constant expansion of knowledge and technology; understands the need for lifelong education and training. The student independently searches available databases for information necessary to conduct analyses.	[SK1] Assessment of group work skills [SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice
[K7_U06] is able to apply statistical methods, computer solutions, especially bioinformatics methods to design experiments and technologies, analyze experimental results and technological processes and solve and technological processes and solve problems in the field of biotechnology, is able to use biotechnological databases	The student is able to use statistical methods to design experiments and technologies, analyze experimental results and technological processes and solve problems in the field of biotechnology, and is able to use biotechnology databases. The student has the skills to: compare the frequency of variables between groups, compare the level of variables between groups, assess changes over time, determine the sample size in analyses, determine the power of a statistical test, assess the normality of distribution, assess the correlation of continuous variables, perform linear regression using biomedical data, perform odds ratio analyses, performing logistic regression in population analyzes such as cases: control group, performing Kaplan-Meier analyzes in a group where an end point occurred in some cases.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

Subject contents

Descriptive statistics. Comparison of variable frequencies between groups. Comparison of the level of variables between groups - parametric and non-parametric methods. Correlation in biomedical analyses. Linear Regression. The importance of the regression coefficient in the description of biomedical data. Odds ratio. Logistic regression in case-control population analyses. Kaplan-Meier analysis. Construction of the research population. Explanation of terms: endpoints, truncated data. The problem of multiple comparisons in biomedical research.

Prerequisites and co-requisites

Knowledge of mathematics, molecular biology, human genetics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	60.0%	100.0%

Recommended reading

Basic literature	Presentations presented during classes
Supplementary literature	Jerrold H. Zar, Biostatistical analysis, 5th ed., Pearson International Edition, 2010 Literature available at the Nanotechnology Library of the Gdańsk University of Technology
eResources addresses	Adresy na platformie eNauczanie: Biostatystyka - Moodle ID: 33725 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33725

Example issues/ example questions/ tasks being completed	Students perform statistical calculations using specialized software, present the results and discuss the results during subsequent classes: 1. Comparison of variable frequencies between groups. 2. Comparison of the level of variables between groups - parametric and non-parametric methods, paired and unpaired tests. Example: comparison of drug response between a study group and a control group. 3. Sample size in analyses, power of statistical test. 4. Assessment of normality of distribution. 5. Correlation. Linear Regression. The importance of the regression coefficient in the description of biomedical data. 6. Odds ratio. Logistic regression in case-control population analyses. 7. Kaplan-Meier analysis. Construction of the research population. Explanation of terms: endpoints, truncated data.
Work placement	Not applicable