

**Subject card**

<b>Subject name and code</b>	Statistics with elements of mathematics in biological sciences, PG_00129307						
<b>Field of study</b>	Biology						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2024/2025		
<b>Education level</b>	undergraduate studies	<b>Subject group</b>			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	1	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	1	<b>ECTS credits</b>			2.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>					
<b>Conducting unit</b>	Pracownia Fizjologii Roślin i Toksykologii -> Katedra Biologii Eksperymentalnej i Biotechnologii Roślin -> Faculty of Biology						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr Agnieszka Baścik-Remisiewicz				
	<b>Teachers</b>		dr Agnieszka Baścik-Remisiewicz				
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Additional information: Multimedia-based lecture						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	30		2.0		18.0	50
<b>Subject objectives</b>	<p>1. To prepare students to use basic methods of statistical analysis and to apply them in the interpretation of biological phenomena and processes.</p> <p>2. To acquaint students with the tools of mathematics necessary to understand the laws of nature and to describe life processes.</p>						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOLL3_U04] The graduate will be able to apply statistical methods and computer algorithms and techniques to the description of phenomena and the analysis of biological data	The graduate is able to apply basic statistical and mathematical methods to description of phenomena and analysis of biological data.	[SU4] test/exam - oral or written
	[BIOLL3_W11] The graduate knows the basic methods of statistical analysis and their importance in the interpretation of phenomena and processes	The graduate knows and understands the basic methods of statistical analysis and their importance in the interpretation of biological phenomena and processes.	[SW4] test/exam - oral or written
	[BIOLL3_K01] The graduate is prepared to evaluate their own knowledge, understand the need for continuous learning and development, and is open to new ideas	The graduate knows the limitations of his/her own knowledge and understands the need for continuous learning and development and is open to new ideas.	[SK8] observation of student's independent or team work
	[BIOLL3_W08] The graduate knows the tools of mathematics necessary to understand the laws of nature and to describe life processes	The graduate knows and understands the tools of mathematics necessary to understand the laws of nature and to describe life processes.	[SW4] test/exam - oral or written
Subject contents	<p><b>Statistics:</b> Basic concepts of statistics (types of variables, types of scales, rules for approximating numbers, histograms). Descriptive statistics: samples size, arithmetic, geometric and harmonic mean, variance, standard deviation, coefficient of variation, standard error, median and modal value, skewness, confidence interval. Binomial and normal distributions. Statistical hypothesis testing. Homogeneity of variance (Snedecor's F test). Student's t-test. One-way analysis of variance and Kruskal-Wallis test. The chi-square test. Selected non-parametric tests. Correlation and simple regression.</p> <p><b>Mathematics:</b> Introduction to the calculus of probability. Number sequences and series. Derivative of a function and its application. Integral calculus of functions of one variable: the indeterminate and determinate integral, methods of calculating integrals and their application. Real and imaginary numbers. Actions on matrices.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	51.0%	100.0%
Recommended reading	Basic literature	<p>Baścik-Remisiewicz A., Chincinska I., Miklaszewska M. 2020. Wybrane zagadnienia ze statystyki i matematyki. Przewodnik do ćwiczeń dla studentów biologii. Wydawnictwo Uniwersytetu Gdańskiego</p> <p>Łomnicki A. 2014. (lub wydania wcześniejsze). Wprowadzenie do statystyki dla przyrodników. PWN, Warszawa.</p> <p>Krysicki W., Włodarski L. 2015. (lub wydania wcześniejsze). Analiza matematyczna w zadaniach. Część I i II. PWN, Warszawa.</p>	
	Supplementary literature	Wrzosek D. 2010. (lub wydania wcześniejsze). Matematyka dla biologów. Wydawnictwo Uniwersytetu Warszawskiego.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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