

Subject card

Subject name and code	Statistics in Biotechnology, PG_00153657						
Field of study	Statystyka w biotechnologii						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study 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	1		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	UG Institute of Biotechnology -> Intercollegiate Faculty of Biotechnology UG-MUG -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Grzegorz Gołuński				
	Teachers		dr Grzegorz Gołuński mgr Marcin Zakrzewski				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	15.0	0.0	0.0	25
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 13220 ATC-MWB-L1DZ (2025/2026) Statystyka w biotechnologii https://mdl.ug.edu.pl/course/view.php?id=13220						
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	25		5.0		20.0	50
Subject objectives	The purpose of the course is to provide students with basic knowledge of general statistics in the fields of descriptive statistics and statistical inference; to develop the ability to use basic statistical terms and to interpret the obtained research results. Students will acquire the ability to prepare data for analysis and to conduct basic statistical analyses as well as to prepare a written report on the analyses conducted. They will also develop the ability to assess the measurement data critically.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BIOTECHL3_W06] The graduate knows and understands basic knowledge in science and natural sciences necessary for understanding the phenomena and biological processes, particular cellular processes at the molecular level	The student has knowledge of general statistics and uses basic statistical terms. The student knows the principles of interpretation of research results and application of statistical methods in the field of biotechnology.	[SW4] test/egzamin - ustny lub pisemny
	[BIOTECHL3_U06] The graduate is able to prepare a targeted written study in Polish and/or English, covering detailed issues in the field of biotechnology, using scientific language, including specialist terminology and conceptual apparatus appropriate for biotechnology	The student is able to independently prepare a report on the analysis in the written form.	[SU3] opracowanie tekstowe/praca pisemna
	[BIOTECHL3_U03] The graduate is able to use basic mathematical and statistical methods to describe phenomena and analyse data; analyse basic data in professional databases used in biotechnology	The student knows how to prepare experimental data for statistical analysis and understands as well as applies methods of statistical inference. The student is familiar with the basic software to perform statistical analysis.	[SU4] test/egzamin - ustny lub pisemny
Subject contents	Lecture part • Introductory topics and structure analysis. Concept and methods of statistics, applications of statistics, basic concepts, statistical investigation (types, stages), types of variables and scales. Presentation of data: series, tables, graphs. Analysis of distribution: classical and positional measures of central tendency, dispersion, asymmetry and kurtosis. • Random variables and their distributions. Discrete and continuous random variable. The concept of probability density functions and cumulative distribution function. Properties of distributions: binomial, Poisson, normal, t-Student, chi-square. • Statistical inference. Concept of random sample, sample statistic and estimator. Point and interval estimation: mean, variance and proportion. Determination of minimum sample size. Verification of statistical hypotheses. The essence of hypothesis testing. Relationship between error of the first and second type in statistical hypothesis testing. Significance level vs. critical area - critical significance level (p-value). The concept of test power. Examples parametric and non-parametric tests uses. One-way analysis of variance (ANOVA), post-hoc tests, nonparametric equivalents of analysis of variance (Kruskal-Wallis test, Friedman test). • Correlation and regression analysis. Pearson's linear correlation coefficient and testing its significance. Linear regression function (estimation and interpretation of function parameters, evaluation of fit, testing the significance of the regression coefficient). Spearman's rank correlation coefficient and testing its significance. Laboratory part • Basics of computational and statistical methods used in scientific research • Working with a spreadsheet (basic operations, formulas, functions, cell blocking) • Graphical presentation of data - types of charts, use, correct description • Use of advanced MS Excel functions for data analysis - autofilters, indirect sums, sorting, conditional formatting • Basics of descriptive statistics - measures of location, measures of dispersion, measures of asymmetry of distribution • Interdependence of phenomena: linear correlation, other types of dependence		
Prerequisites and co-requisites	basic computer familiarity		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	theory exam	51.0%	35.0%
	practical exam	51.0%	50.0%
	report	51.0%	15.0%
Recommended reading	Basic literature 1. Andrzej Stanisław, Przystępny kurs statystyki. Tom 1. Statystyki podstawowe, Wydawnictwo StatSoft, Kraków 2006 2. Wiesława Makać, Danuta Urbanek-Krzysztofiak; Metody opisu statystycznego, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2020 3. Andrzej Balicki, Wiesława Makać; Metody wnioskowania statystycznego, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2010 4. Materials prepared by the lecturer		

	Supplementary literature	Tomasz Górecki; Podstawy statystyki z przykładami w R, Wydawnictwo BTC, Legionowo 2011
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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