

Subject card

Subject name and code	Statistics in Biotechnology, PG_00153657						
Field of study	Biotechnology						
Date of commencement of studies	October 2026	Academic year of realisation of subject			2026/2027		
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						
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						
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 elements of advanced knowledge of general statistics in the fields of descriptive statistics and statistical inference; to develop the ability to use statistical terms and to interpret the obtained research results. Students will acquire the ability to prepare data for analysis and to conduct 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 possesses structured and advanced knowledge of exact and natural sciences necessary to understand biological phenomena and processes, in particular cellular processes at the molecular level.		The student has advanced knowledge of general statistics and uses selected statistical terms. The student knows the principles of interpretation of research results and application of statistical methods in the field of biotechnology.		[SW4] test/exam - oral or written		
	[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] text preparation/written work		
	[BIOTECHL3_U03] The graduate applies mathematical and statistical methods to describe phenomena and analyze data and is able to use 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 applies software to perform statistical analysis.		[SU4] test/exam - oral or written		

Subject contents	<p>Lecture part</p> <ul style="list-style-type: none"> • Introductory topics and structure analysis. Concept and methods of statistics, applications of statistics, 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. <p>Laboratory part</p> <ul style="list-style-type: none"> • Computational and statistical methods used in scientific research • Working with a spreadsheet (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 • Elements 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	<table border="1" data-bbox="448 920 1487 1061"> <thead> <tr> <th data-bbox="448 920 794 958">Subject passing criteria</th> <th data-bbox="794 920 1141 958">Passing threshold</th> <th data-bbox="1141 920 1487 958">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 958 794 992">report</td> <td data-bbox="794 958 1141 992">51.0%</td> <td data-bbox="1141 958 1487 992">15.0%</td> </tr> <tr> <td data-bbox="448 992 794 1025">practical exam</td> <td data-bbox="794 992 1141 1025">51.0%</td> <td data-bbox="1141 992 1487 1025">50.0%</td> </tr> <tr> <td data-bbox="448 1025 794 1061">theory exam</td> <td data-bbox="794 1025 1141 1061">51.0%</td> <td data-bbox="1141 1025 1487 1061">35.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	report	51.0%	15.0%	practical exam	51.0%	50.0%	theory exam	51.0%	35.0%
Subject passing criteria	Passing threshold	Percentage of the final grade													
report	51.0%	15.0%													
practical exam	51.0%	50.0%													
theory exam	51.0%	35.0%													
Recommended reading	<table border="1" data-bbox="448 1068 1487 1547"> <tbody> <tr> <td data-bbox="448 1068 794 1458">Basic literature</td> <td colspan="2" data-bbox="794 1068 1487 1458"> 1. Andrzej Stanisław, Przystępny kurs statystyki. Tom 1. Statystyki podstawowe, Wydawnictwo StatSoft, Kraków 2006 2. Wiesława Makać, Danuta Urbanek-Krzysztofiać; 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 </td> </tr> <tr> <td data-bbox="448 1458 794 1518">Supplementary literature</td> <td colspan="2" data-bbox="794 1458 1487 1518">Tomasz Górecki; Podstawy statystyki z przykładami w R, Wydawnictwo BTC, Legionowo 2011</td> </tr> <tr> <td data-bbox="448 1518 794 1547">eResources addresses</td> <td colspan="2" data-bbox="794 1518 1487 1547"></td> </tr> </tbody> </table>			Basic literature	1. Andrzej Stanisław, Przystępny kurs statystyki. Tom 1. Statystyki podstawowe, Wydawnictwo StatSoft, Kraków 2006 2. Wiesława Makać, Danuta Urbanek-Krzysztofiać; 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					
Basic literature	1. Andrzej Stanisław, Przystępny kurs statystyki. Tom 1. Statystyki podstawowe, Wydawnictwo StatSoft, Kraków 2006 2. Wiesława Makać, Danuta Urbanek-Krzysztofiać; 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														

Document generated electronically. Does not require a seal or signature.