University of Gdańsk

Subject card

Subject name and code	Biotechnology in medicine - Therapies and medical technologies Methodology (M05_B3), PG_00196946		
Field of study	Biotechnology		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	3	Language of instruction	Polish
Semester of study	5	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	0.0	0.0	20.0	0.0	0.0	20

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	20	5.0	25.0	50

Subject objectives

The aim of the course is to familiarize students with the applications of selected methods of statistical analysis in biotechnology, especially in its medical aspect.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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(s)) will understand the fundamental statistical techniques used in medical biotechnology, such as regression analysis, multivariate approaches, parametric (Student's t, ANOVA), and non-parametric (Mann-Whitney U, Wilcoxon) tests.The concepts of biological experiment design, such as sampling, randomization, and confounding variable control, are also understood by the student (s).	[SU1] oral statement/conversation/ discussion [SU3] text preparation/written work [SU4] test/exam - oral or written

<table>
<tr><td>Subject contents</td><td>Verification of statistical hypothesis and selected issues of statistical inferencea) parametric and non-parametric tests, criteria for selecting tests of differences significanceb) comparison of two samples: Student's t-test, Cochran-Cox testc) non-parametric equivalents of the Student's t-test (Mann-Whitney test, Wilcoxon test; Wald-Wolfowitz runs test, Kolmogorov-Smirnov test)(d) one-way analysis of variance (ANOVA), post-hoc tests(e) non-parametric equivalents of analysis of variance (Kruskal-Wallis test, Friedman test)(f) analysis of qualitative data (chi-square test, Fisher's exact test, Yates correction)g) introduction to the analysis of interdependence of phenomena (correlation, regression, R coefficients, R square)</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of the Modules 01-04 contents</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>practical test</td><td>51.0%</td><td>70.0%</td></tr>
<tr><td>report</td><td>51.0%</td><td>15.0%</td></tr>
<tr><td>oral exam</td><td>51.0%</td><td>15.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>• Materials provided by the lecturer
• Andrzej Stanisz, Przystępny kurs statystyki. Tom 1. Statystyki podstawowe, Wydawnictwo StatSoft, Kraków 2006</td></tr>
<tr><td>Supplementary literature</td><td>• Andrzej Balicki, Wiesława Makać, Metody wnioskowania statystycznego, Wydawnictwo UG, Gdańsk 2010
• Włodzimierz Meissner, Metody statystyczne w Biologii, Wydawnictwo UG, Gdańsk 2011
• Wiesława Makać, Danuta Urbanek-Krzysztofiak; Metody opisu statystycznego, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2020
• Tomasz Górecki; Podstawy statystyki z przykładami w R, Wydawnictwo BTC, Legionowo 2011</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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