GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Visualization and interpretation of experimental data, PG_00069248		
Field of study	Biotechnology		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Chemistry Technology and Biotechnology of Food -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Agata Sommer	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	5.0	40.0	0.0	0.0	0.0	45

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	45	5.0	25.0	75

Subject objectives

The aim of the course is to develop practical skills in the analysis, interpretation, and presentation of experimental data using widely available digital tools. Students will learn how to create clear and aesthetically pleasing charts, identify outliers, apply basic analytical functions (derivatives, integrals), and prepare concise reports and presentations that support the communication of research findings using Excel and graphic tools.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U05] proposes solutions to technological and scientific problems in biotechnology and related fields using experimental methods and bioinformatics, statistics and specialized databases	The student is able to use tools for data analysis and visualization to solve research problems in biotechnology and related fields.	[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K7_U01] designs experiments in accordance with the state of the art and the latest scientific literature, using computer methods of data analysis, computer simulations	The student is able to design a basic experiment using digital tools and data analysis methods, in line with current knowledge.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject
[K7_W04] selects methods of data analysis, including bioinformatics, statistical and molecular modeling, useful for solving technological and scientific problems in biotechnology and related fields	The student has knowledge of data analysis methods (statistical, bioinformatic), their applications in biological sciences, and the selection of appropriate visualization techniques.	[SW3] Assessment of knowledge contained in written work and projects
[K7_K01] understands the need to constantly update knowledge based on the state of the art in accordance with the latest scientific literature, improve professional skills and the importance of teamwork	The student understands the importance of updating knowledge in the field of data analysis and visualization and is able to collaborate in a team when preparing reports and presenting results.	[SK2] Assessment of progress of work [SK1] Assessment of group work skills

Subject contents

Introduction to the visualization and processing of experimental data using spreadsheet software. Working with data in Excel data organization, functions, chart creation. Advanced visualization techniques: dual Y-axis plots, broken axis charts, spectrum plots (spectroscopy, chromatography), outlier analysis. Data calculations and transformations: derivatives, integrals, custom functions. Introduction to supporting tools: Canva (e.g., infographics), Zotero/Mendeley (reference management), AI-based elements. Preparation of a data report and presentation individual or group project.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basic knowledge of Excel (or an equivalent spreadsheet program) and the ability to work with numerical data. General understanding of experimental data processing and basic chart creation. Willingness to work with various digital tools and openness to developing analytical skills.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Completion of practical exercises</td><td>50.0%</td><td>30.0%</td></tr>
<tr><td>Class participation</td><td>80.0%</td><td>10.0%</td></tr>
<tr><td>Project (report and/or results presentation)</td><td>50.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Bruce, P., Bruce, A. (2017). Practical Statistics for Data Scientists. OReilly Media.

Crawley, M. J. (2014). Statistics: An Introduction using R. Wiley.

Walkenbach, J. (2015). Excel 2016 Bible. Wiley. (or a newer edition, depending on the software version)</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Few, S. (2009). Now You See It: Simple Visualization Techniques for Quantitative Analysis. Analytics Press.

Wong, D. M. (2011). The Wall Street Journal Guide to Information Graphics. W. W. Norton.

Online educational resources</td></tr>
<tr><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Charts based on experimental data including calculation of derivatives and/or area under the curve.

Visualization using broken axes, dual Y-axes, or spectral plots.

Detection and presentation of outliers.

Functional presentation of results using Excel, Canva, RawGraph, and Prisma.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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