GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00073755		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Biomaterials Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Joanna Sypniewska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	15.0	0.0	15.0	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	10.0	45.0	100

Subject objectives

The aim of the course is to prepare students to independently process, analyze, and critically interpret scientific research results using statistical and analytical methods and computational tools, based on knowledge of research methodology, data analysis, and scientific reasoning, in the context of solving research problems related to biomaterials and medical engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U14] integrates information obtained from literature and other properly selected sources, including those in a foreign language, creatively interpreting and critically evaluating them, and drawing conclusions	Is able to integrate the results of their own research with information obtained from scientific literature, including English-language publications, using comparative analysis and critical source evaluation to interpret findings and draw well-supported research conclusions.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
[K7_U01] uses acquired analytical, simulation and experimental methods as well as mathematical models to solve engineering problems in the field of medical engineering	Is able to process and analyze experimental research results in medical engineering and biomaterials science, using appropriately selected analytical and statistical methods and mathematical models to solve research problems.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K7_U02] formulates hypotheses to test research problems in the field of medical engineering	Is able to formulate testable research hypotheses concerning biomaterial properties, using experimental data analysis and appropriately selected statistical methods to evaluate the hypotheses.	[SU2] Assessment of ability to analyse information

<table>
<tr><td>Subject contents</td><td>Course content – lecture

Fundamentals of scientific research data processing and analysis. Organization and preparation of experimental data, descriptive statistics, measurement uncertainty, and repeatability analysis. Selection of statistical methods according to data characteristics and research problems. Hypothesis testing, analysis of relationships between variables, and principles of data visualization and critical interpretation of research results.

Course content – exercises

Preparation and organization of experimental datasets. Calculation of basic statistical parameters, distribution analysis, and assessment of result variability. Selection and application of statistical analyses, research hypothesis testing, and preparation of tables and graphs. Interpretation of results using selected computational tools.

Course content – project

Independent analysis of a selected dataset from biomaterials research. Formulation of a research problem and hypothesis, selection of data analysis methods, and preparation of calculations and visualizations. Comparison of findings with scientific literature, critical evaluation of their reliability, and preparation of a research report and presentation of conclusions.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of mathematics, statistics, and scientific research methodology, as well as the ability to use spreadsheet software and interpret experimental research results.</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>Assessment of the appropriateness of the selection and application of experimental data analysis methods based on the computational analysis of research results.</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Assessment of the critical interpretation of research results and their comparison with scientific literature, including English-language publications, based on a research report and presentation of conclusions.</td><td>60.0%</td><td>60.0%</td></tr>
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<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Montgomery D. C., Design and Analysis of Experiments, 10th ed., Wiley, 2019.</td></tr>
<tr><td>Supplementary literature</td><td></td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>How should experimental data be prepared for statistical analysis? Which statistical methods should be used to evaluate research results, and why? How can the repeatability and reliability of measurement results be assessed? How can a research hypothesis be formulated, and how should an appropriate method for testing it be selected? How should research results be presented in tables and graphs? How can experimental findings be compared with published scientific literature to draw well-supported conclusions?</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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