GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00073362		
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	10.0
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. Michał Bartmański	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	150.0	0.0	0.0	180

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=9098

Moodle ID: 9098 Metody badań biomateriałów https://enauczanie.pg.edu.pl/2025/course/view.php?id=9098

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	180	10.0	60.0	250

Subject objectives

The aim of the course is to familiarize the student with basic and modern methods for biomaterial testing and with the principles of selecting appropriate techniques for evaluating their physicochemical, mechanical, and biological properties.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study	Characterizes current methods for biomaterial testing and their development trends.	[SW3] Assessment of knowledge contained in written work and projects
[K7_W02] has structured and well-founded knowledge covering fundamental issues in the field of medical sciences allowing to design medical devices, rehabilitation systems and to formulate research procedures	Explains the importance of physicochemical, mechanical, and biological properties of biomaterials in medical applications.	[SW3] Assessment of knowledge contained in written work and projects
[K7_U03] uses knowledge related to diagnostic techniques, medical and rehabilitation procedures, anatomy and physiology to formulate assumptions referring to design and research procedures	Selects appropriate research methods for evaluating of biologica properties of biomaterials.	[SU1] Assessment of task fulfilment
[K7_K11] is aware of importance of professional acting, the need for critical verification of acquired knowledge and consulting experts opinion in case of facing difficulties with individual problem solving	Critically evaluates biomaterial testing results and recognizes the need for expert consultation in complex research problems.	[SK5] Assessment of ability to solve problems that arise in practice

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

Fundamentals of planning and conducting biomaterial studies. Methods for evaluating morphology, topography, chemical and phase composition, surface, mechanical, corrosion, and biological properties. Selection of research methods according to biomaterial type and application. Interpretation and critical evaluation of research results.

Course content – laboratory

Practical application of selected biomaterial testing methods. Sample preparation, measurements, analysis, and interpretation of results concerning surface, mechanical, physicochemical, and biological properties.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></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>Report</td><td>56.0%</td><td>100.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>Standards concerning the evaluation of biomaterial properties, including the ISO 10993 series – Biological evaluation of medical devices, covering selected aspects of the biological evaluation of medical devices and materials.
Peer-reviewed scientific publications in the fields of biomaterials, surface engineering, and implants, published in journals such as ACS Biomaterials Science & Engineering, Applied Surface Science, Biomaterials Science, and Acta Biomaterialia.</td></tr>
<tr><td>Supplementary literature</td><td>-</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>• Evaluation of morphology, topography, and surface structure of biomaterials.
• Analysis of chemical and phase composition of biomaterials.
• Evaluation of surface properties and wettability.
• Mechanical, tribological, and corrosion testing.
• Evaluation of biological properties and biocompatibility of biomaterials.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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