GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Methods of testing materials and tissues, PG_00053363		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Obligatory subject group in the field of study Optional subject group 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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Piotr Jasiński	
	Teachers	prof. dr hab. inż. Piotr Jasiński	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

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	30	3.0	17.0	50

Subject objectives

The aim of the course is to familiarize students with the test materials, biomaterials and tissue for the purpose of biomedical engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U52] can examine tissues, materials and biomaterials used in biomedical engineering	Knowledge of materials and tissue properties	[SU3] Assessment of ability to use knowledge gained from the subject
[K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions	Students will be able to analyse in detail the operation of components, systems and systems related to a given subject, measure their parameters and assess their technical characteristics. He/she is also able to plan and carry out experiments, interpret the obtained results and formulate conclusions on their basis.	[SU4] Assessment of ability to use methods and tools
[K7_W51] Knows and understands, to an increased extent, selected aspects of chemistry and biochemistry constituting general knowledge in the field of biomedical engineering.	Knowledge of materials and tissue testing methods in chemistry and biochemistry	[SW1] Assessment of factual knowledge
[K7_W52] Knows and understands, to an increased extent, selected aspects of materials science and biomaterials, constituting general knowledge in the field of biomedical engineering	Knowledge of materials and tissue testing methods in materials engineering and biomaterials	[SW1] Assessment of factual knowledge

<table>
<tr><td>Subject contents</td><td colspan="3">Spectroscopic methods of materials testing - comparison of UV-VIS and IR spectroscopy. Spectroscopic methods of materials testing - comparison of methods: classical IR spectroscopy, FTIR spectroscopy and Raman spectroscopy. Optical microscopy and electron microscopy. EDX spectroscopy. Impedance spectroscopy - what can be measured, 2, 3 and 4 electrode measurements. Impedance spectroscopy - equivalent schemes (Randles and Brick Layer Model), fitting results to equivalent schemes, spectrum analysis methods (DRT). Application of impedance spectroscopy to the analysis of two-phase systems. Gas chromatography - measurement system and detectors used, measurement of two-phase systems. Measurements of single phase systems, two phase systems and thin films.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></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>Lecture</td><td>50.0%</td><td>70.0%</td></tr>
<tr><td>Lab</td><td>50.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">Szczepaniak, Metody instrumentalne w analizie chemicznej, PWN 2007
Robert M. Silverstein, Francis X. Webster, David J. Kiemle, Spektroskopowe metody identyfikacji związków organicznych, Wydawnictwo Naukowe PWN 2007
A. Cygański, Metody Spektroskopowe w Chemii Analitycznej, WNT 2002</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Bogusz W., Krok F., Elektrolity stałe, WNT 1995</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">What is the difference between FTIR and Raman spectroscopy?</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
</table>

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