



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	February 2027		Academic year of realisation of subject			2027/2028	
Education level	second-cycle 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	2		Language of instruction			Polish	
Semester of study	3		ECTS credits			2.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Piotr Jasiński				
	Teachers		prof. dr hab. inż. Piotr Jasiński				
Lesson types	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_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		
Subject contents	Course content – lecture 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.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Lecture		50.0%		70.0%		
	Lab		50.0%		30.0%		

Recommended reading	Basic literature	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
	Supplementary literature	Bogusz W., Krok F., Elektrolity stałe, WNT 1995
	eResources addresses	
Example issues/ example questions/ tasks being completed	What is the difference between FTIR and Raman spectroscopy?	
Practical activities within the subject	Not applicable	

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