



## Subject card

Subject name and code	Biocompatible and of Special Purpose Materials, PG_00053524						
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
Education level	first-cycle studies		Subject group		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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Radosław Pomećko				
	Teachers		dr inż. Radosław Pomećko				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	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 this course is to present students materials used in biomedical engineering, the materials properties and way of their manufacturing.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W53] Knows and understands, to an advanced extent, selected aspects of materials science and biomaterials constituting general knowledge related to the field of study		The student knows the main biocompatible materials used in ophthalmology, dentistry, orthopedics, aesthetic medicine, cardiac surgery, etc. Is able to characterize these materials and propose the choice of material depending on the function.		[SW1] Assessment of factual knowledge		
	[K6_U52] can determine properties of materials and biomaterials used in biomedical engineering		The student is able to list the main types of materials used in biomedical engineering, describes the properties of individual groups of materials		[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information		

Subject contents	<p>The Laboratories are the continuation of subjects presented during the lectures. The experiments illustrate the aspects of:</p> <ol style="list-style-type: none"> <li>1. Surface lipophilization,</li> <li>2. Photopolymerization in stomatology,</li> <li>3. Drug carriers,</li> <li>4. Synthesis and application of hydrogels,</li> <li>5. Synthesis of contrast materials,</li> <li>6. Biomaterials degradation.</li> </ol> <p>LECTURE: General characteristics of biocompatible materials, methods of sterilization of materials, biocompatible materials for the regeneration of visual and hearing defects, biocompatible materials used in dentistry, biocompatible materials used in orthopedics, materials for tissues regeneration, materials for skin regeneration, materials used in cardiac surgery, tissue engineering, materials used in aesthetic medicine, radiological contrasts, electronic devices to improve the functioning of the body, drug carriers, artificial ion channels, surface modification of biocompatible materials.</p>		
Prerequisites and co-requisites	Student knows basic terms as: stability of organic and inorganic compounds, mechanical and chemical properties, stability in physiological environment, irradiation resistance, structure of biological materials, denaturation, enzymatic activity.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	passing of oral exam on the issues discussed during the lecture and the laboratory	60.0%	70.0%
	participation in all laboratory classes, correct performance of experiments and obtaining positive grades on all tests	60.0%	30.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Biomateriały, Jan Marciniak, Wydawnictwo Politechniki Śląskiej, 2013.</li> <li>2. K. Żelechowska. Materiały biogodne i specjalnego przeznaczenia. Wydawnictwo Politechniki Gdańskiej, 2014. ISBN 978-83-7348-546-4</li> <li>3. Biocybernetyka i inżynieria biomedyczna 2000. Tom 3. Sztuczne narządy i Materiały biogodne pod red. M. Nałęcza. Akademicka Oficyna Wydawnicza EXIT, Warszawa 2001.</li> <li>4. Farmacja stosowana, S. Janicki, A. Fiebig, M. Sznitowska, Warszawa, PZWL 2006</li> </ol>	
	Supplementary literature	1. Biomateriały w stomatologii, J. Marciniak, M. Kaczmarek, A. Ziębowicz, Wydawnictwo Politechniki Śląskiej, 2008 2. Leksykon materiałoznawstwa na CD, pod red. L.A. Dobrzańskiego, Format CD-R, ISBN: 978-83-910914-1-8	
	eResources addresses	Adresy na platformie eNauczanie:	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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