



Subject card

Subject name and code	Biocompatible and of Special Purpose Materials, PG_00053524						
Field of study	Biomedical Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
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 Solid State Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Kamila Sadowska				
	Teachers						
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, cardiosurgery, etc. He can characterize these materials and propose the selection of material depending on the function performed.		[SW1] Assessment of factual knowledge		
	[K6_U52] can determine properties of materials and biomaterials used in biomedical engineering		The student is able to name the main types of materials used in biomedical engineering, describes the properties of individual groups of materials.		[SU2] Assessment of ability to analyse information		
Subject contents	LECTURE: General characterization of materials used in medicine and analytical laboratories. Sterilization of medical materials. Ophthalmologic materials, contact lenses, mineral and organic glass, enzymatic purification of contact lenses, liquids, droplets and ointments. Dental materials: bores, polishing pastes, dental restoration. Structure of bones, materials for bone implants. Surface modification. Bone cements, tissue glues, threads. In-growing and biodegradable materials. Tissue engineering. Materials for cardiac surgery. Roentgenographic contrasts. Magnetic resonance imaging contrasts. Radiopharmaceutics for diagnosis and therapy. Microspheres, microcapsules, liposome. Drug careers. Nanoparticles in medicine. Blood and plasma and their substitutes. Organ storage techniques. Physiological salt solution. Enteral feeding. Dressing materials. Plaster, orthopedic cast. Mechanical birth control. Disposable medical products. Dialysis. Medical wastes treatment. Legal regulations.						
Prerequisites and co-requisites	Student knows basic terms as: Stability of organic and inorganic compounds, mechanical and chemical properties, stability in physiological enviroment, irradiation resistance, structure of biological materials, denaturation, enzymatic activity.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Exam		60.0%		100.0%		

Recommended reading	Basic literature	<p>1. Biocybernetyka i inżynieria biomedyczna 2000. Tom 3. Sztuczne narządy i Materiały biozgodne pod red. M. Nałęcza. Akademicka Oficyna Wydawnicza EXIT, Warszawa 2001.</p> <p>2. Farmacja stosowana, S. Janicki, A. Fiebig, M. Sznitowska, Warszawa, PZWL 2006</p> <p>3. Postępy technologii biomedycznych, pod red. Zbigniewa Nawrata, Zabrze 2008. ISBN-978-83-88427-77-0; www.robinheart.pl</p> <p>4. K. Żelechowska. Materiały biozgodne i specjalnego przeznaczenia. Wydawnictwo Politechniki Gdańskiej, 2014. ISBN 978-83-7348-546-4</p>
	Supplementary literature	<p>1. Biomateriały w stomatologii, J. Marciniak, M. Kaczmarek, A. Ziębowicz, Wydawnictwo Politechniki Śląskiej, 2008</p> <p>2. Leksykon materiałoznawstwa na CD, pod red. L.A. Dobrzańskiego, Format CD-R, ISBN: 978-83-910914-1-8</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.