GDAŃSK UNIVERSITY OF TECHNOLOGY

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	1. Biocybernetyka i inżynieria biomedyczna 2000. Tom 3. Sztuczne narządy i Materiały biozgodne pod red. M. Nałęcza. Akademicka Oficyna Wydawnicza EXIT, Warszawa 2001. 2. Farmacja stosowana, S. Janicki, A. Fiebig, M. Sznitowska, Warszawa, PZWL 2006 3. Postępy technologii biomedycznych, pod red. Zbigniewa Nawrata, Zabrze 2008. ISBN-978-83-88427-77-0; www.robinheart.pl 4. K. Żelechowska. Materiały biozgodne i specjalnego przeznaczenia. Wydawnictwo Politechniki Gdańskiej, 2014. ISBN 978-83-7348-546-4
	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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