



Subject card

Subject name and code	Implants and Artificial Organs, PG_00068172						
Field of study	Biomedical Engineering						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2025/2026		
Education level	first-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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Functional Materials 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	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 4514 Implanty i sztuczne narządy https://enauczanie.pg.edu.pl/2025/course/view.php?id=4514						
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	15		1.0		9.0	25
Subject objectives	The aim of the course is to familiarise students with the principles of designing, selecting and evaluating implants and artificial organs, taking into account material, biomechanical, electronic and physiological aspects, as well as to understand their functioning in the human body.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W10] knows and understands, to an advanced extent, the parameters, functions, and methods of analysis, design, and optimization of electronic circuits and systems, the definitions of error and measurement uncertainty, measurement methods, including time, frequency, and phase measurements, the properties of converters, and methods of digital signal processing, as well as the basic processes occurring in the life cycle of technical devices, objects, and systems, and methods of supporting processes and functions, specific to the field of study	The student has an advanced knowledge and understanding of the principles of operation and parameters of electronic and measuring systems used in implants and artificial organs.	[SW1] Assessment of factual knowledge
	[K6_U52] can determine properties of materials and biomaterials used in biomedical engineering	The student is able to assess the suitability of materials and biomaterials used in implants and artificial organs for specific applications in biomedical engineering.	[SU3] Assessment of ability to use knowledge gained from the subject
	[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 has an advanced knowledge and understanding of the properties of materials and biomaterials used in implants and artificial organs.	[SW1] Assessment of factual knowledge
	[K6_W51] Knows and understands, to an advanced extent, selected aspects of biomedical diagnostics and human anatomy and physiology, constituting general knowledge related to the field of study	The student has an advanced knowledge and understanding of the basic aspects of human anatomy and physiology relevant to the design, selection and functioning of implants and artificial organs.	[SW1] Assessment of factual knowledge
Subject contents	Course content – lecture The subject matter includes: pacemakers, artificial hearts, artificial kidneys, artificial pancreases, electronic hearing aids, artificial eyes, artificial skin, and artificial lungs.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	50.0%	100.0%
Recommended reading	Basic literature	<ul style="list-style-type: none"> Artificial Organs, editor Nadey S. Hakim, Springer 2009 Tissue Engineering and Artificial Organs, Joseph D. Bronzino. Taylor&Frqancis Group 2026 Tissue Engineering for Artificial Organs: Regenerative Medicine, Smart Diagnostics and Personalized Medicine, editor A.Hasan, Wiley-VCH 2017 	
	Supplementary literature	<ul style="list-style-type: none"> Journal of Artificial Organs, Springer Artificial Organs, Wiley 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	List the components of a epi-retinal artificial eye.		
Practical activities within the subject	Not applicable		

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