GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Implants and Artifical Organs, PG_00068172		
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
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						

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_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
[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

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	• 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	• Journal of Artificial Organs, Springer • Artificial Organs, Wiley
eResources addresses	

Example issues/ example questions/ tasks being completed

List the components of a epiretinal artificial eye.

Practical activites within the subject

Not applicable

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