



Subject card

Subject name and code	, PG_00058713						
Field of study	Materials Engineering, Materials Engineering						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2023/2024		
Education level	second-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	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Zakład Technologii Biomateriałów -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Michał Bartmański					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	0.0	45
	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	45	5.0		50.0	100	
Subject objectives	The purpose of the course is to familiarize students with the use of advanced materials, including biomaterials, in various industries, as well as with their obtaining techniques.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_W05	The student is able to independently design the manufacturing and modification process of the implant and select appropriate testing techniques to determine its properties.			[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		
	K7_W07	The student is familiar with modern techniques for manufacturing and surface modification of biomaterials and implants, and can determine the possibilities of developing these techniques in the field of materials engineering.			[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation		
	K7_U01	The student is able to independently use literature databases, patent databases, understands and correctly analyzes the information obtained from them.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	K7_U06	The student is able to select the appropriate material and its manufacturing technique in the context of biomaterials and implants. He/she can independently carry out surface modification of biomaterials.			[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		
Subject contents	Definitions, division, classification and properties of biomaterials and implants. Manufacturing techniques of biomaterials. Methods of testing biomaterials (physical, mechanical, chemical and biological). Techniques of surface modification of implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Description of the laboratory exercise	56.0%	25.0%
	Colloquium	56.0%	50.0%
	Project	56.0%	25.0%
Recommended reading	Basic literature	1 A. Zielinski et al, Nanotechnologies in medicine and cosmetology, PG Publishing House, Gdansk 2018.2. K. Żelachowska et al, Nanotechnology in practice, PWN Scientific Publishers, Warsaw 2016.3 R.W. Kelsall, I.W. Hamley, M. Geoghegan. Nanotechnologies, Wydawnictwo Naukowe PWN, Warsaw 2011.4. Kurzydłowski, M. Lewandowska, Nanomaterials inżynierskie konstrukcyjne i funkcjonalne, Wydawnictwo Naukowe PWN, Warsaw 2009.5. J. Jakubowicz, Surface treatment of titanium biomaterials, Wydawnictwo Politechniki Poznańskiej, Poznań 2019.	
	Supplementary literature	1. R. Tadeusiewicz, Biomedical Engineering, Publishing House of the AGH University of Science and Technology, Krakow 2008.2 N.P. Mahalik: Micromanufacturing and Nanotechnology, Springer Verlag 2006.	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	Definitions, division, classification and properties of biomaterials and implants.Manufacturing techniques of biomaterials.Methods of testing biomaterials (physical, mechanical, chemical and biological).Techniques of surface modification of implants.Design of technological processes in manufacturing and surface modification of biomaterials and implants.		
Work placement	Not applicable		