

## Subject card

Date of commencement of study   Date of commencement of studies   Subject group   Subject   Subject   Subject   Subject   Subject   Subject   Subject   Subject   Subject	Subject name and code	, PG_00058713								
Date of commencement of studies  Education level  Subject group										
Education level second-cycle studies Subject group related to scientific research in the field of study 1 Language of instruction Polish 4.0  Semester of study 1 ECTS credits 4.0  Learning profile general academic profile Assessment form exam Subject supervisor Ground and Ship Technology - Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Manufacturing and Materials Including -> Institute of Materials Incl	Date of commencement of	0 0		Academic year of			2023/2024			
Year of study  1	Education level	second-cycle studies				Subject group related to scientific				
Semester of study  Learning profile  Gonducting unit  Division of Biomaterials Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Machanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Machanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Machanical Engineering and Ship Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Machanical Engineering and Ship Technology -> Faculty of Machanical Engineering -> Faculty of Ma	Mode of study	Full-time studies		Mode of delivery			at the university			
Learning profile  Division of Biomaterials Technology >- Institute of Manufacturing and Materials Technology >- Faculty of Machanical Engineering and Ship Technology Name and surname of lecturer (lecturers)  Teachers  Lesson types and methods of instruction  Learning activity and number of study hours  Learning activity and number of study hours  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.  K7_W05  The student is able to independently design the manufacturing and sold testing and surfactivity and written work and materials and implants. He/she can be repossibilities of developing these techniques in the field of materials and implants. He/she can independently use literature databases, patent databases, understands and correctly use literature databases, patent databases, patent databases, understands and correctly use literature databases, patent databases, understands and correctly databases, understands and correctly databases, understands and correctly databases and magnification of biomaterials and implants. He/she can independently use literature databases, understands and correctly databases, understands and correctly databases, understands and correctly databases and professional databases.  K7_U01  The student is able to independently use literature databas	Year of study	1		Language of instruction			Polish			
Division of Biomaterials Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Manufacturing Anderials Technology -> Faculty of Manufactur	Semester of study	1		ECTS credits			4.0			
Mechanical Engineering and Ship Technology	Learning profile	general academic profile		Assessment form			exam			
Lesson types and methods of instruction	Conducting unit	Division of Biomateria Mechanical Engineer	livision of Biomaterials Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						Faculty of	
Lesson types and methods of instruction   Number of study hours   15.0   0.0   15.0   15.0   15.0   0.0   45				dr inż. Michał	Bartmański					
of instruction    Number of study hours   E-learning hours included: 0.0   E-learning activity and number of study hours   Learning activity   Learning activity   Participation in didactic   Participation in classes included in study plan   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.    Course outcome   Subject outcome   Method of verification   SW2] Assessment of knowledge contained in precess of the implant and select purpopriate testing techniques to determine its properties.   SW3] Assessment of knowledge contained in presentation   SW3] Assessment of knowledge contained in presentation   SW3] Assessment of knowledge contained in written work and projects   SW2] Assessment of knowledge contained in presentation   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in presentation   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in presentation   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of knowledge contained in written work and projects   SW3] Assessment of task fulfillment   SW3] Assessment of task fulfil	·						1			
E-learning nours included: 0.0  Learning activity and number of study hours  Number of study hours  Number of study hours  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.  Course outcome  The student is able to independently design the manufacturing and surface modification of biomaterials and implants. He/she can independently use literature databases, patent databases, understands and correctly analyzes the information obtained from them.  K7_U06  The student is able to independently use literature databases, patent databases, understands and correctly analyzes the information obtained from them.  K7_U06  The student is able to independently use literature databases, patent databases, understands and correctly analyzes the information obtained from them.  K7_U06  The student is able to select the appropriate sterical and its manufacturing and surface modification of biomaterials and implants. He/she can independently use literature databases, patent databases, understands and correctly analyzes the information obtained from them.  K7_U06  Definitions, division, classification and properties of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials on the chemical and biological). Techniques of surface modification of biomaterials on the independent processes in manufacturing and surface modification of biomaterials and implants.		Number of study		+	<del> </del>		t			
Learning activity and number of study hours   Participation in didactic classes included in study plan										
Subject objectives			Participation in classes include				Self-study		SUM	
Course outcome   Subject outcome   Method of verification			<u>'</u>		5.0		50.0		100	
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.    K7_W07   The student is familiar with modern techniques for manufacturing and surface modification of biomaterials and implants, and can techniques in the possibilities of developing these techniques in the field of materials engineering.    K7_U01   The student is able to independently use literature databases, understands and correctly analyzes the information obtained from them.    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. Methods of testing biomaterials (physical, mechanical, chemical and biological). Techniques of surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants.	Subject objectives									
independently design the manufacturing and modification process of the implant and select appropriate testing techniques to determine its properties.  K7_W07  The student is familiar with modern techniques for manufacturing and surface modification of biomaterials and implants, and can letermine the possibilities of developing these techniques in the field of materials engineering.  K7_U01  The student is able to independently use literature databases, patent databases, understands and correctly analyzes the information obtained from them.  K7_U06  The student is able to representation  K7_U06  The student is able to representation  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 and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of biomaterials and implants. He/she can independently carry out surface modification of implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. He/she can independently carry out surface modification of implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants.	Learning outcomes	Course out	come	Subj	ect outcome			Method of ver	ification	
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.  K7_U01  The student is able to independently use literature databases, understands and correctly analyzes and the information obtained from them.  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.  Subject contents  Definitions, division, classification and properties of biomaterials and implants. Manufacturing techniques of biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants.  Prerequisites		K7_W05		independently design the manufacturing and modification process of the implant and select appropriate testing techniques to			contained in presentation [SW3] Assessment of knowledge contained in written work and			
independently use literature databases, patent databases, patent databases, patent databases, understands and correctly analyzes the information obtained from them.  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.  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 biomaterials and implants. Design of technological processes in manufacturing and surface modification of biomaterials and implants.  Prerequisites		K7_W07		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			contained in written work and projects [SW2] Assessment of knowledge			
appropriate material and its manufacturing technique in the context of biomaterials and implants. He/she can independently carry out surface modification of biomaterials.  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		K7_U01		The student is able to independently use literature databases, patent databases, understands and correctly analyzes the information obtained			use methods and tools [SU1] Assessment of task			
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		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			fulfilment [SU5] Assessment of ability to			
	Subject contents	biomaterials.Methods of testing biomaterials (physical, mechanical, chemical and biological).Techniques of surface modification of implants.Design of technological processes in manufacturing and surface								

Data wygenerowania: 14.04.2025 20:02 Strona 1 z 2

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	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 eNauczanie:				
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					

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

Data wygenerowania: 14.04.2025 20:02 Strona 2 z 2