GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Degradation and material research methods, PG_00039382		
Field of study	Medical and Mechanical Engineering, Mechanical and Medical Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor		
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	0.0	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 aim of the course is to gain knowledge by students in the field of degradation of biomaterials implemented into the human organism. Moreover, the student will acquire knowledge of the methods that are used to determine the basic chemical, physical, mechanical and biological properties of biomaterials.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U07	The student is able to determine the degree of degradation of biomaterials in laboratory conditions and to perform and interpret measurements of the properties of biomaterials.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
K6_W13	The student is able to independently indicate the areas of application of mechanical and medical engineering in medicine, including implantology, incl. in research and degradation.	[SW1] Assessment of factual knowledge
K6_U09	The student is able to select the material for the implant, also in terms of its degradation in the human body.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
K6_W04	The student is able to choose the appropriate methods of biomaterials research in order to determine their properties.	[SW1] Assessment of factual knowledge

Subject contents

The following issues will be presented during the course:

1. Forms of degradation of biomaterials.
2. Physical methods of research on biomaterials.
3. Chemical research methods of biomaterials.
4. Mechanical methods of biomaterials research.
5. Biological methods of research on biomaterials.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="2">The student should have basic knowledge of biomaterials engineering, including basic definitions and methods of surface modification.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Laboratory</td><td>56.0%</td><td>40.0%</td></tr>
<tr><td>Exam</td><td>56.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. J. Marciniak, Biomaterials, Publishing House of the Silesian University of Technology, Gliwice, 2013.
2. J. Jakubowicz, Surface treatment of titanium biomaterials, Publishing House of the Poznań University of Technology, Poznań 2019.
3. B. Świeczko-Żurek, Biomaterials, Gdańsk University of Technology Publishing House, Gdańsk, 2009.
4. M. Nałęcz, S. Błażewicz, L. Stoch, Biomaterials, EXIT Academic Publishing House, Warsaw, 2003.
5. J. Marciniak, M. Kaczmarek, A. Ziębowicz, Biomaterials in dentistry, Publishing House of the Silesian University of Technology, Gliwice 2008.</td></tr>
<tr><td>Supplementary literature</td><td>1. R. Tadeusiewicz, Biomedical Engineering, Publishing House of the AGH University of Science and Technology, Kraków 2008.
2. S. Błażewicz, J. Marciniak, Biomedical Engineering - Fundamentals and Applications, VOLUME 4 Biomaterials. Academic Publishing House, EXIT, 2005.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Research methods for the degradation of biomaterials.
2. The main methods of chemical research of metallic biomaterials.
3. The main methods of physical research of biomaterials.
4. Influence of simulated body fluids on the structure and properties of selected modifications of implant surfaces.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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