



Subject card

Subject name and code	Polymers materials in medicine – structure and desing, PG_00053275						
Field of study	Mechanical and Medical Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024				
Education level	second-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery	at the university				
Year of study	1	Language of instruction	English				
Semester of study	2	ECTS credits	2.0				
Learning profile	general academic profile	Assessment form	assessment				
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Agata Sommer					
	Teachers	dr inż. Agata Sommer dr hab. inż. Hanna Staroszczyk dr inż. Izabela Koss-Mikołajczyk					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	30
	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	30	0.0	0.0	30		
Subject objectives	To broaden the knowledge on medical applications of polymer materials. To acquaint with the chemical structure and properties of polymers.						
Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K7_W09] He/she in-depth knowledge related to diagnosis techniques and medical procedures in the scope of the field of study of mechanical-medical engineering	The student is able to independently study literature, search through patent databases and expand his knowledge in the scope of use of polymeric materials In medicine. He/she can propose appropriate method of processing and testing of structure of biomaterials.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge				
	[K7_U13] He/she uses in-depth knowledge related to the diagnoses techniques and medical procedures in the scope of the field of study of mechanical-medical engineering	The student is able to independently study literature, search through patent databases and expand his knowledge in the scope of use of polymeric materials In medicine. He/she can propose appropriate method of processing and testing of structure of biomaterials.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment				
	[K7_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	Prepare for active participation in lectures and seminars in a foreign language.	[SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness [SK2] Assessment of progress of work				
	[K7_U82] is able to proficiently obtain and process information related to field of study and academic environment in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR)	The ability to communicate fluently in English in the academic and professional environment.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools				

Subject contents	<p>Lectures will cover the following topics:</p> <ol style="list-style-type: none"> 1. Chemical structure and reactivity of polymers 2. Synthesis of polymers and their application in pharmacy, medicine, surgery 3. Methods of producing biomaterials. Electrospinning, 3D printing. 4. Biocompatibility of polymeric materials. 5. Degradation and biodegradation of biomaterials. <p>During seminars, students will give and discuss presentations related to current issues of the course content, e.g., structure and function of nanobiomaterials, drug delivery systems for cancer, synthesis of dressing biomaterials, and others.</p>														
Prerequisites and co-requisites	<p>Knowledge of basic chemistry (symbols of elements, chemical bonds, distinguishing basic functional groups) and polymer chemistry (differences in the structure of polysaccharides, proteins; the concept of monomer, dimer, polymer).</p>														
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Active participation in all lectures and seminars</td> <td>0.0%</td> <td>10.0%</td> </tr> <tr> <td>Preparation and delivery of a presentation</td> <td>60.0%</td> <td>30.0%</td> </tr> <tr> <td>Lecture test</td> <td>60.0%</td> <td>60.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Active participation in all lectures and seminars	0.0%	10.0%	Preparation and delivery of a presentation	60.0%	30.0%	Lecture test	60.0%	60.0%
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Recommended reading	Basic literature	Current scientific literature covering the subject matter as given by the lectures													
	Supplementary literature	Current scientific literature covering the subject matter as given by the lectures													
	eResources addresses	Adresy na platformie eNauczanie: Polymeric materials in medicine – structure and desing 2023/24 - Moodle ID: 33842 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33842													
Example issues/ example questions/ tasks being completed	<p>What is a polymer glass temperature value and how can it be used?</p> <p>What is the main difference between IR and FTIR techniques?</p> <p>What type of mechanisms are leading to polymer degradation?</p> <p>Which factors need to be considered during <i>in vivo</i> evaluation of biomaterials biocompatibility?</p>														
Work placement	Not applicable														