



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	Lectures will cover the following topics: <ol style="list-style-type: none">1. Chemical structure and reactivity of polymers2. Synthesis of polymers and their application in pharmacy, medicine, surgery3. Methods of producing biomaterials. Electrospinning, 3D printing.4. Biocompatibility of polymeric materials.5. Degradation and biodegradation of biomaterials. 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.		
Prerequisites and co-requisites	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).		
Assessment methods and criteria	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%
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://enauczanie.pg.edu.pl/moodle/course/view.php?id=33842	
Example issues/ example questions/ tasks being completed	What is a polymer glass temperature value and how can it be used? What is the main difference between IR and FTIR techniques? What type of mechanisms are leading to polymer degradation? Which factors need to be considered during <i>in vivo</i> evaluation of biomaterials biocompatibility?		
Work placement	Not applicable		