GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Hydrogel Modyfication Methods, PG_00073369		
Field of study	Mechanical and Medical Engineering		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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	10.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Biomaterials Technology -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Beata Świeczko-Żurek	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	100.0	0.0	0.0	100

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=9030

Moodle ID: 9030 Hydrogel Modyfication Methods
https://enauczanie.pg.edu.pl/2025/course/view.php?id=9030

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	100	20.0	130.0	250

Subject objectives

The aim of the course is to gain the knowledge necessary for producing and improving hydrogels. It involves getting to know modern production techniques, the active substances used in them, and the related research.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] has structured and well-founded knowledge covering issues in the field of mechanical engineering allowing to design medical devices, rehabilitation systems and to formulate research procedures	Is able to produce and understand the use of hydrogels in clinical practise.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
[K7_U01] uses acquired analytical, simulation and experimental methods as well as mathematical models to solve engineering problems in the field of medical engineering	They can use specialized equipment to produce hydrogel and characterize it.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
[K7_U15] evaluates the feasibility of advanced methods and tools for solving complex engineering tasks of a practical nature, characteristic of the field of study, and selects and applies appropriate methods and tools for this purpose	They have advanced knowledge about hydrogels and their effects on tissues.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

Course content – laboratory

The content is about the technology for producing hydrogels, active substances as additives to them, and the reactions of the resulting composite with tissues.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final project	60.0%	100.0%

Recommended reading	Basic literature	1. Y.-D. Cho, K.-H. Kim, Y.-M. Lee, Y. Ku, i Y.-J. Seol, „Periodontal Wound Healing and Tissue Regeneration: A Narrative Review”, Pharmaceuticals, t. 14, nr 5, s. 456, 2021, doi: 10.3390/ph14050456. 2. C. Rodrigues Neves i in., „Human saliva stimulates skin and oral wound healing in vitro”, J Tissue Eng Regen Med, t. 13, nr 6, s. 1079–1092, 2019, doi: 10.1002/term.2865.
	Supplementary literature	1. M. Hao i in., „Functional drug-delivery hydrogels for oral and maxillofacial wound healing”, Front Bioeng Biotechnol, t. 11, sie. 2023, doi: 10.3389/fbioe.2023.1241660. 2. W. Zhang i in., „Promoting Oral Mucosal Wound Healing with a Hydrogel Adhesive Based on a Phototriggered S‐Nitrosylation Coupling Reaction”, Advanced Materials, t. 33, nr 48, grudz. 2021, doi: 10.1002/adma.202105667.
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Technology for producing hydrogels. 2. Active substances placed in hydrogels. 3. Studies used for hydrogels	
Practical activites within the subject	Not applicable	

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