GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Biopolymers in cosmetology, PG_00060783		
Field of study	Chemical Technology		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Polymer Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Maciej Sienkiewicz	
	Teachers	dr hab. inż. Justyna Kucińska-Lipka dr inż. Marcin Włoch	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	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	2.0	18.0	50

Subject objectives

The aim of the course is to familiarize students with the types, properties and applications of biopolymers in cosmetology.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] is able to apply knowledge of inorganic, organic, physical and analytical chemistry and identify appropriate sources of information to design and synthesize simple chemical compounds, carry out basic physicochemical and analytical measurements	The student is able to use knowledge of inorganic, organic, physical and analytical chemistry to obtain and characterize cosmetic and medical products containing protein and saccharide biopolymers.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K6_W09] has knowledge of the technological and functional properties of polymers, the physical basis and processing methods of polymers and rubber	The student knows and is able to list and characterize in detail the types, properties, functions and applications of biopolymers in cosmetology and aesthetic medicine.	[SW1] Assessment of factual knowledge
[K6_K05] is aware of the social role of a technical university graduate, and in particular understands the need to formulate and communicate to the public, in particular through the mass media, information and opinions on the achievements of technology and other aspects of engineering activity	Students are aware of the impact of synthetic materials on human health and life, particularly in the area of biopolymers' use in cosmetology. Students can describe the types and applications of biopolymers in cosmetology and aesthetic medicine in a scientific and popular science context.	[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness

<table>
<tr><td>Subject contents</td><td>Course content – lecture
• Definition and classification of biopolymers used in cosmetology
• Polysaccharides (e.g., starch, cellulose and its derivatives, agar) - properties, functions, and applications in cosmetology
• Proteins (e.g., gelatin, collagen, elastin) - properties, functions, and applications in cosmetology
• Latest trends in the use of biopolymers in cosmetology and aesthetic medicine
Course content – laboratory
• Preparation of multilayer hybrid dressings using 3D printing (FDM, SLA)
• Preparation of active ingredient carriers using various techniques, including SC/PL, casting, and soaking
• Preparation of polymer hydrogels based on various biopolymers
• Studying the physicochemical and mechanical properties (including microscopic examination) of biopolymer materials
• Preparation of polymer microcapsules as active ingredient carriers</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>laboratory (entry tests, reports, attendance and activity)</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>lecture (written test)</td><td>60.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>• M. Molski: Chemia piękna, Tom 1 i 2, PWN, Warszawa 2021
• J.F. Rabek: Współczesna wiedza o polimerach. Tom 1: Budowa strukturalna polimerów i metody badawcze, PWN, Warszawa 2017
• J.F. Rabek: Współczesna wiedza o polimerach. Tom 2: Polimery naturalne i syntetyczne, otrzymywanie i zastosowania, PWN, Warszawa 2017</td></tr>
<tr><td>Supplementary literature</td><td>• J.F. Rabek: Polimery i ich zastosowania interdyscyplinarne, Tom 1 i 2, PWN, Warszawa 2021</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>• Polymers Used in Cosmetology and Aesthetic Medicine
• Types, Properties, and Applications of Saccharide Biopolymers in Cosmetology
• Types, Properties, and Applications of Protein Biopolymers in Cosmetology</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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