GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Bio-Components in Cosmetics, PG_00064325		
Field of study	BIOKOMPONENTY W KOSMETYKACH		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
Education level	second-cycle studies	Subject group	Optional subject group Specialty 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Biotechnology and Microbiology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Anna Brillowska-Dąbrowska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	30.0	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	25.0	75

Subject objectives

Lecture:

To provide students with theoretical knowledge concerning the origin, structure, properties, and applications of biologically active ingredients used in modern cosmetic products.

Project:

The objective of the project Biocomponents in Cosmetics is to broaden students knowledge of natural active ingredients used in cosmetology, their biological properties, and their impact on the human body and skin microbiome.

Project practical part:

Students will acquire practical skills in microbiology and molecular biology, essential for assessing the safety and effectiveness of biologically active ingredients used in cosmetic products.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U02] carries out experiments using properly selected techniques and apparatus, taking advantage of new developments in technology and related fields	The student is able to apply molecular biology techniques appropriate for the cosmetic industry.	[SU4] Ocena umiejętności korzystania z metod i narzędzi
[K7_U05] uses instrumental methods applied in technology and related fields	The student is able to select an appropriate methodology for specific tasks in an industrial microbiology laboratory.	[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU2] Ocena umiejętności analizy informacji
[K7_W01] defines the phenomena, processes and laws of nature used to produce consumer goods and provide services	The student has knowledge of the origin, properties, mechanisms of action, and applications of biologically active ingredients used in cosmetics.	[SW1] Ocena wiedzy faktograficznej
[K7_K03] can interact and work in a group, taking on a variety of roles	The student is able to prepare, in a group, a review of scientific information and critically analyze it.	[SK1] Ocena umiejętności pracy w grupie

Subject contents

Course content – lecture

The course covers an introduction to cosmetic biocomponents, including definitions, classification, and natural sources. It addresses plant-derived active ingredients, such as extracts, oils, and phytopetides, their biological properties, and applications in skin care. Biopolymers and functional components, including proteins, polysaccharides, and lipids, are analyzed in terms of their role in cosmetic formulations. The course also explores probiotics, prebiotics, and postbiotics and their effects on the skin microbiome. Enzymes and other biologically active components, their mechanisms of action, and applications in cosmetic products are discussed. Students learn about factors affecting the stability and safety of biocomponents and methods for evaluating their effectiveness. The course concludes with trends and innovations in bio-inspired cosmetics, including modern production methods and the potential of biocomponents in the cosmetics of the future.

Course content – project

The course introduces cosmetic biocomponents, covering their definitions, classification, and natural sources. It examines plant-derived active ingredients, including extracts, oils, and phytopetides, focusing on their biological properties and applications in skin care. Biopolymers and functional components, such as proteins, polysaccharides, and lipids, are discussed in relation to their role in cosmetic formulations. The course also addresses probiotics, prebiotics, and postbiotics and their influence on the skin microbiome. Enzymes and other biologically active substances, their mechanisms of action, and applications in cosmetic products are analyzed. Students explore factors affecting the stability and safety of biocomponents and learn methods for evaluating their effectiveness. The course concludes with an overview of trends and innovations in bio-inspired cosmetics, highlighting modern production techniques and the potential of biocomponents in future cosmetic products.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final test (lecture)	60.0%	50.0%
Practical test (laboratory part of the project)	60.0%	12.5%
Project presentation	60.0%	25.0%
Short tests (laboratory part)	60.0%	12.5%

Recommended reading

Basic literature	Scientific publications related to the lecture topics
Supplementary literature	Depending on the project topic
eResources addresses	

Example issues/ example questions/ tasks being completed

Final exam:

How can you test whether a given essential oil has bactericidal properties?

Short tests:

Which method can be used to isolate DNA?

Practical activites within the subject

Not applicable

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