



Subject card

Subject name and code	BIOTECHNOLOGY AND LIPID TECHNOLOGY, PG_00065642						
Field of study	BIOTECHNOLOGIA I TECHNOLOGIA LIPIDÓW						
Date of commencement of studies	October 2025		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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Chemistry Technology and Biotechnology of Food -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Dorota Martysiak-Żurowska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	15.0	60
	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	60		10.0		55.0	125
Subject objectives	The aim of the course is to familiarize students with lipid biotechnology and technologies used in production processes of industrial importance in the food, fuel, pharmaceutical, and medical industries, as well as with the directions and possibilities of their development. The course also aims to organize knowledge of biotechnological and technological techniques used in the fat industry, to develop skills in analyzing unit processes applied in the extraction, modification, and refining of fats, and to determine the purposes and methods of obtaining lipids and their derivatives through biotechnology for use in the food, cosmetics, pharmaceutical, medical, and technical industries.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_K03] understands the social role and importance of providing reliable information and opinions to the public	The student can explain the importance of lipid biotechnology in the context of public health, food, pharmaceutical, and environmental industries in a manner understandable to non-specialists, ensuring accuracy and credibility of the message.	[SK1] Ocena umiejętności pracy w grupie [SK5] Ocena umiejętności rozwiązywania problemów występujących w praktyce
	[K7_W07] has the skills to design experiments with respect to the protection of intellectual property and the principles of bioethics and applicable legislation	The student is able to assess a research experiment on lipid modification and analysis, taking into account biosafety principles, research ethics, and intellectual property protection in the context of applying the results in industrial and scientific practice.	[SW1] Ocena wiedzy faktograficznej [SW2] Ocena wiedzy zawartej w prezentacji [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
	[K7_U03] designs technological solutions for obtaining useful goods using biomolecules and living organisms based on the state of the art in accordance with the latest scientific literature	The student is able to interpret a technological process for the production and modification of lipids (e.g., fatty acids, phospholipids, bioactive lipids) using microorganisms and lipolytic enzymes, based on current scientific literature and biotechnology trends.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania [SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU2] Ocena umiejętności analizy informacji [SU1] Ocena realizacji zadania
Subject contents	[K7_U05] proposes solutions to technological and scientific problems in biotechnology and related fields using experimental methods and bioinformatics, statistics and specialized databases	The student is able to analyze and solve problems related to the optimization of lipid biotechnological processes using experimental methods, statistical tools, and specialized databases, as well as to interpret the obtained results in the context of practical applications.	[SU4] Ocena umiejętności korzystania z metod i narzędzi [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU2] Ocena umiejętności analizy informacji
	Course content – lecture		
	Lecture: 1. Scopes of biotechnological activities used in obtaining, purifying, processing and modifying lipids. 2. Biotechnology in the edible fat industry. 3. Biotechnology in the production of biofuels. 4. Biotechnology in the production of detergent ingredients and lipid derivatives for the cosmetics industry. 5. Biotechnological use of lipids for pharmaceutical purposes. Liposome technology in basic research and clinical pharmacology. 6. Commercialized lipid-based products (including glycerol) produced biotechnologically 7. Technologies for extracting, purifying and modifying food fats. Lab: Biotechnological processes of fat modification (esterification) and analysis of the impact of these processes on the physicochemical properties of fats. The use of biotechnological methods for the degradation of waste animal and plant fats. Seminar: Student presentations based on the most current articles in the field presented in the course.		
Prerequisites and co-requisites	Knowledge of the basics of food chemistry and food analysis.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture: exam	60.0%	50.0%
	Laboratory: Reports presenting the implementation of laboratory tasks	60.0%	30.0%
	Seminar: presentation of own work, discussion of the topic	60.0%	20.0%
Recommended reading	Basic literature	- Lipid Biotechnology Ed. Tsung Min k., Gardner H. - Technologia Tłuszczów Jadalnych. Niewiadomski H. WNT, Warszawa, - Biotechnologia żywności . WNT, pod red. W. Bednarski, A. Repsa - Surowce Tłuszczowe. Niewiadomski H. WNT, Warszawa,	

	Supplementary literature	Current scientific articles on the issues of the subject, e.g. Journal of American Oil Chemists Society, Eur. J. Lipid Sci. Technol., INFORM (ed. AOCS).
	eResources addresses	
Example issues/ example questions/ tasks being completed	Chemical and enzymatic interesterification of edible fats. Obtaining cocoa butter substitutes by fractional crystallization method. Microbial bioconversion of fat waste.	
Practical activities within the subject	Not applicable	

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