



## Subject card

Subject name and code	Biotechnology and Lipid Technology, PG_00058261						
Field of study	Biotechnology						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	second-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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Chemistry, Technology and Biochemistry of Food -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Dorota Martysiak-Żurowska				
	Teachers		dr hab. inż. Dorota Martysiak-Żurowska  dr inż. Karol Parchem  dr inż. Agata Sommer				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	15.0	75
	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	75		20.0		55.0	150
Subject objectives	Familiarizing students with lipid biotechnology and technology in production processes of industrial importance in the food, fuel and pharmaceutical industries, as well as with the directions and possibilities of their development.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W08] has a profound knowledge of methods of obtaining biotechnological products, possibilities and limitations related to the design of biotechnological processes, understands the specificity of the biotechnological industry, both in terms of organization, management and economic analysis	The student has knowledge of biotechnological and technological techniques used in the fat industry. Analyzes unit processes used in obtaining, modifying and refining of fats. Defines the goals and methods of obtaining lipids and their derivatives through biotechnology and their use in the food, pharmaceutical and technical industries. The student knows the possibilities and limitations of process design biotechnological.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
	[K7_W07] knows issues related to plant and animal raw materials, their quality, impact on human health, processing technology and chemical and biological hazards resulting from process treatment and storage	Analyzes and defines properties nutritional and physicochemical properties of plant and animal raw materials and fatty products obtained from them. He is aware of the impact of their quality on human health.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
	[K7_U05] is able to apply instrumental methods of quantitative and qualitative analysis and studies on activity of biomolecules, select and apply diagnostic and analytical methods in the field of his/her specialty with particular emphasis on genetic, molecular and microbiological diagnostics and diagnostics based on antigen-antibody reaction	The student is able to use instrumental analysis methods to study the properties and profiles of lipid biomolecules using the latest analytical methods.	[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
Subject contents	<p>Lecture: 1. Scopes of biotechnological activities used in obtaining, purifying, processing and modifying lipids.</p> <p>2. Biotechnology in the edible fat industry.</p> <p>3. Biotechnology in the production of biofuels.</p> <p>4. Biotechnology in the production of detergent ingredients and lipid derivatives for the cosmetics industry.</p> <p>5. Biotechnological use of lipids for pharmaceutical purposes. Liposome technology in basic research and clinical pharmacology</p> <p>6. Commercialized lipid-based products (including glycerol) produced biotechnologically</p> <p>7. Technologies for extracting, purifying and modifying food fats.</p> <p>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.</p>		
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
	laboratory	60.0%	30.0%
	seminar	60.0%	20.0%
	exam	60.0%	50.0%

Recommended reading	Basic literature	<ul style="list-style-type: none"> <li>- Biotechnologia żywności . WNT, pod red. W. Bednarski, A. Repsa</li> <li>- Technologia Tłuszczów Jadalnych. Niewiadomski H. WNT, Warszawa,</li> <li>- Surowce Tłuszczowe. Niewiadomski H. WNT, Warszawa,</li> <li>- Lipid Biotechnology Ed. Tsung Min k., Gardner H.</li> </ul>
	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 (wyd. AOCS).
	eResources addresses	Adresy na platformie eNauczanie: Biotechnologia i technologia lipidów 2024/25 - Moodle ID: 41948 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=41948">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=41948</a>
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. Conditions for biocatalysis to obtain biosurfactants.	
Work placement	Not applicable	

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