



Subject card

Subject name and code	Brewing: technologies and waste, PG_00062304						
Field of study	Recycling and Energy Recovery						
Date of commencement of studies	October 2025		Academic year of realisation of subject			2025/2026	
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery			at the university	
Year of study	1		Language of instruction			Polish	
Semester of study	1		ECTS credits			8.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Chemistry Technology and Biotechnology of Food -> Faculty of Chemistry -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Robert Tylingo				
	Teachers		dr hab. inż. Robert Tylingo				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	100.0	0.0	100
	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	100		10.0		90.0	200
Subject objectives	The aim of the course is to prepare students for the practical application of knowledge and skills essential for the efficient management of waste in the brewing industry, with an emphasis on innovative methods of recovery and utilization of resources. Students will understand the key processes and technologies used in beer production, considering the environmental and economic aspects of waste management. The subject highlights the importance of teamwork and business realities, preparing participants for creative problem-solving and effective collaboration within a team.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_K04] effectively, clearly and unambiguously communicates information, describes activities and communicates their results/ outcomes to engineers or the wider public using appropriate communication methods and tools.		Effective communication, presentation of solutions and research findings, utilizing various forms of transmission.			[SK1] Assessment of group work skills [SK2] Assessment of progress of work	
	[K6_K02] cooperates with other people in the implementation of teamwork, both as a leader and a team member, effectively achieving the assumed goals.		Development of teamwork skills, both as a leader and a group member, in the context of process engineering.			[SK1] Assessment of group work skills [SK3] Assessment of ability to organize work	
	[K6_U05] plans, prepares and conducts engineering activities in the field of raw materials and energy recovery, applying practical knowledge and understanding of the specificity of materials, devices and tools, processes and technologies.		Practical skills in planning and implementing waste management strategies in the brewing industry.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information	
	[K6_W05] analyzes practical issues in the field of recovery of raw materials and energy, using knowledge and understanding of: materials, devices and tools, processes and technologies.		Understanding technological processes in brewing, identifying waste streams, and exploring their recovery opportunities.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation	

Subject contents	The convention of conducting classes includes teaching methods, focusing on the implementation of group projects. During the last 5 weeks of the semester, students in teams of 3-5 engage in a project related to waste management from the brewing industry. 1. Introduction to brewing technologies: Students visit a brewery to understand basic processes and operations used during beer production, with aspects related to waste included. 2. Teamwork and project management: Learning effective team collaboration, time management, and coordination of activities necessary to achieve project goals. 3. Research and development in recovery engineering: Participants use brewery facilities to conduct research and develop new technologies for recovering resources from waste. 4. Project finalization: Teams prepare the final product along with complete technical documentation, presenting their work results in front of a panel of experts. The "Resource and Energy Recovery Engineering" course focuses on the practical application of knowledge in environmental protection, with an emphasis on modern recycling solutions. Responsible management of natural resources and the transformation of waste into valuable resources are keys to sustainable development.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	activity during classes	50.0%	25.0%
	presentation of project results	60.0%	25.0%
	group project evaluation	60.0%	50.0%
Recommended reading	Basic literature	Anderson, N.G., "Practical Process Research and Development", Academic Press, San Diego, California, USA, 2000.Synoradzki, L., Wisiański, J., "Podstawy projektowania procesów technologicznych. Od laboratorium do instalacji przemysłowej", OWPW, 2019.Filipkowski, P., MalinowskaPańczyk, E., Synowiecki, J., Tylingo, R., Ćwiczenia laboratoryjne z technologii fermentacyjnych przemysłu spożywczego", Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2011,	
	Supplementary literature	Lewis, Michael J., and Tom W. Young. Brewing. Springer, 2002.	
		Hayes, Ted. Beer: Tap into the Art and Science of Brewing, Oxford University Press, 2003.	
		eResources addresses	
Example issues/ example questions/ tasks being completed	What are the methods for minimizing waste production in brewing?Designing an energy recovery system from brewing processes.Analysis of possibilities for recycling solid and liquid waste from breweries.		
Work placement	Not applicable		

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