



Subject card

Subject name and code	Sustainability in the chemical industry - team project, PG_00060879						
Field of study	Zrównoważony rozwój w przemyśle chemicznym - projekt zespołowy						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2026/2027		
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	4		Language of instruction		Polish		
Semester of study	7		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Anna Schmidt				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	15.0	0.0	15
	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	15		5.0		30.0	50
Subject objectives	Familiarizing students with the existing possibilities of modifying existing technologies to meet the assumptions of sustainable development and designing alternative technologies.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W03] has knowledge of environmental protection in chemical technology, the classification of technological processes in terms of their environmental impact and how to eliminate the environmental impact of technological installations		The student is able to design technological solutions enabling the production of chemical compounds in waste-free conditions. It can transform existing technologies into processes that significantly reduce waste generation. The student is able to determine environmental hazards appropriate to a given technology. May propose the implementation of new solutions. The student is able to independently assess selected technologies in terms of their impact on the natural environment. It is possible to propose changes that would enable the process to be classified as a green technology.		[SW1] Ocena wiedzy faktograficznej [SW2] Ocena wiedzy zawartej w prezentacji [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym		
	[K6_W04] understands processes occurring in the life cycle of equipment and facilities and has knowledge of mechanical engineering, chemical apparatus, technical thermodynamics and chemical engineering and chemical reactor engineering necessary to analyse technological processes and correctly design installations and systems in the chemical industry		The student independently selects the equipment and process conditions, taking into account the life cycle of individual installation elements in the project.		[SW1] Ocena wiedzy faktograficznej [SW2] Ocena wiedzy zawartej w prezentacji [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym		

Subject contents	Course content – project Selection of existing technological processes. Discussion of existing environmental problems. Attempts to find methods to reduce emissions, sewage and waste generation. Discussion of alternative technologies, for example based on other raw materials, using green energy sources. Group projects based on your own technological concepts. Preparation of mass and energy balance. Selection of technological parameters and appropriate equipment. Management of all mass streams.		
Prerequisites and co-requisites	Knowledge of the basics of chemical technology, chemical equipment, chemical engineering		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Multimedia presentation	60.0%	40.0%
	Ggroup project in the form of a written study.	60.0%	60.0%
Recommended reading	Basic literature	1. Vincenzo Piemonte, Marcello De Falco, Angelo Basile, Sustainable Development in Chemical Engineering: Innovative Technologies, Wiley 2013, ISBN: 978-1-119-95352-4 2. Dai-Viet N. Vo, Sumaiya Zainal Abidin, P. Senthil Kumar, Muthusamy Govarthanan, Emerging Research Trend in Chemical Technology Towards Sustainable Development, Wiley biblioteka online, https://doi.org/10.1002/ceat.202270806 3. Edited By Miguel A. Esteso, Ana Cristina Faria Ribeiro, A. K. Haghi, Chemistry and Chemical Engineering for Sustainable Development Best Practices and Research Directions, ISBN 9781774639085	
	Supplementary literature	Environment, Development and Sustainability A Multidisciplinary Approach to the Theory and Practice of Sustainable Development, Springer journal	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Hydrogen production from water, methane (other organic compounds), biomass, coal. 2. Hydrogen storage. 3. Sulfur production. 4. Production of fuels from various raw materials. 5. Production of polyurethanes from various raw materials. 6. Production of butyraldehyde from various raw materials.		
Practical activities within the subject	Not applicable		

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