

**Subject card**

<b>Subject name and code</b>	Diploma lecture - Waste conversion technologies, PG_00081856						
<b>Field of study</b>	Chemistry						
<b>Date of commencement of studies</b>	October 2024	<b>Academic year of realisation of subject</b>			2026/2027		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study Optional subject group		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	3	<b>Language of instruction</b>			Polish polish		
<b>Semester of study</b>	6	<b>ECTS credits</b>			2.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			credit		
<b>Conducting unit</b>	Laboratory of Photocatalysis -> Department of Environmental Technology -> Faculty of Chemistry -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		dr inż. Anna Gołąbiewska				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	30		5.0		15.0	50
<b>Subject objectives</b>	To acquaint students with waste processing technologies.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_U08] Presents in an understandable way the basic facts about chemistry using a scientific language typical of chemical sciences.	1. lists and defines the concepts of waste management. 2. lists and describes the processes used in the processing, use, and disposal of waste 3. describes the construction and operating principles of installations for physicochemical, biological, and thermal waste treatment 4. discusses the impact of waste production and processing technologies on the natural environment	[SU4] test/exam - oral or written
	[CHEML3_W02] Describes the properties of elements and the most important chemical compounds, enumerates the methods of their preparation and methods of analysis.	It uses nomenclature consistent with IUPA	[SW4] test/exam - oral or written
	[CHEML3_K01] Identifies the level of her/his own knowledge and skills and the need for continuous learning and personal development.	- links the importance of the development of waste management technologies for the good condition of the natural environment and human health	[SK4] test/exam - oral or written
[CHEML3_W03] Explains the relationship between the structure of matter and its observed properties.	- is aware of the negative impact of waste on the environment. - connecting the importance of the development of waste management technologies for the good condition of the natural environment and human health	[SW4] test/exam - oral or written [SW5] implementation of a problem task	
Subject contents	Definition and classification of waste. Types of waste processing methods and technologies: physico-chemical, biological and thermal. Basic processes, operations and equipment. Recycling technologies raw material, material and energy recycling. Municipal waste - characteristics and technological properties. Waste fermentation technologies and products. Storage of waste. Waste composting technologies. Organic waste. Raw materials for biological waste treatment processes. Characteristics, technologies and treatment of hazardous waste. Energy waste. Asbestos waste disposal methods. Industrial waste management. Mineral waste raw materials and technologies for their development. Economic and environmental aspects of waste management. Case study: Scooby Case study: Technology for processing photovoltaic waste. Case study: Recovery and recycling of polymer materials. Design thinking 1 technologies for processing selected waste (egg shells, coffee grounds) Design thinking 2 technologies for processing selected waste (egg shells, coffee grounds)		
Prerequisites and co-requisites	Entrance requirements: basics of general chemistry Additional requirements: basics of chemical technology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test (gamification)	51.0%	100.0%
Recommended reading	Basic literature	1. Czesława Rosik-Dulewska, Podstawy gospodarki odpadami, PWN, Warszawa 2015. 2. Bernd Billitewski, Georg Hardtle, Klaus Marek, Podręcznik gospodarki odpadami, teoria i praktyka, Wydawnictwo Seidel-Przeweck, 2006. 3. Zespół autorów pod redakcją dr hab. Krzysztofa Skalmowskiego, Poradnik gospodarowania odpadami, Wydawnictwo Verlag Dashofer, Warszawa 2014.	
	Supplementary literature	lack	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Chemical recycling 2. Waste classification 3. Hazardous waste		
Work placement	Not applicable		

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