GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00065742		
Field of study	Recycling and Energy Recovery		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Environmental Engineering Technology -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Eliza Kulbat	
	Teachers	dr hab. inż. Eliza Kulbat	

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	0.0	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	0.0	0.0	60

Subject objectives

Introduction to municipal waste management and disposal technologies and methods.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W04] demonstrates knowledge and understanding of research methods (information acquisition, simulations, experimental methods) in the field of technologies related to the recovery of raw materials and energy.	The student knows and understands research methods, including information extraction, simulation, experimental methods in the field of technologies related to resource and energy recovery.	[SW1] Assessment of factual knowledge
[K6_U04] formulates research problems and selects appropriate research methods (information acquisition, simulations, experimental methods) in the field of technologies related to the recovery of raw materials and energy in order to solve specific tasks and to report research results.	Students will be able to identify and formulate research problems in the field of waste management and select appropriate methods to solve them.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W03] identifies problems and phenomena related to the recovery of raw materials and energy as well as applicable concepts, standards and design methods and is aware of their limitations.	The student is able to identify problems and phenomena related to the recovery of raw materials and energy from waste. He/she can present concepts, standards and design methods and is aware of their limitations.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

Legal basis for municipal waste management. EU waste directive, Waste Act of 14 December 2012. Hierarchy of waste management. Physical, chemical and biological properties of waste. Waste collection systems. Waste management and disposal methods: reuse, recycling, thermal methods, composting, anaerobic digestion, landfilling. Organisation and operation of municipal waste landfills.
Sewage sludge as an important group of municipal waste. Legal basis for sewage sludge. Types, properties and quantities of municipal sewage sludge. Thickening and conditioning of sewage sludge. Sewage sludge stabilisation - methane digestion, aerobic biological methods and chemical methods. Sewage sludge dewatering and drying. Thermal methods of sewage sludge disposal.

Prerequisites and co-requisites

Fundamentals of chemistry and microbiology.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Report on laboratory activities</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Test of lecture content</td><td>60.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Rosik-Dulewska C. The basics of waste management, (in Polish), PWN 2015

2. Bernd Bilitewski, Georg Hardtle, Klaus Marek, Waste management handbook (in Polish) - II wydanie Wydawnictwo:Seidel-Przywecki, ISBN: 83-919449-8-0, Wydanie:2006

3. Waste Management. Consequences of the implementation of new legislation (in Polish), Szewczyk-Cieślik Karolina, Hebda Marta, Ewa Romanowska, Wyd. Wiedza i Praktyka, 2020

3.GrygorczukPetersonsE.H., Tałałaj I.A. Shaping waste management in the municipality (in Polish), Podlaska Agencja Zarządzania Energią, Białystok 2007</td></tr>
<tr><td>Supplementary literature</td><td>Act of 14 December 2012 on waste (Journal of Laws 2013, item 21).

EU directives on waste management, legal acts on waste management in force in Poland.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Discuss the factors affecting the efficiency of the sludge thickening process.

Assess the fertilising values of compost.

Discuss methods of municipal waste management in Poland.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.