



Subject card

Subject name and code	, PG_00064672						
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			Optional 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	3	ECTS credits			10.0		
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 dr hab. inż. Krzysztof Czerwionka mgr inż. Anna Wilińska-Lisowska					
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		140.0	250	
Subject objectives	The aim of the course is to introduce students to modern technologies for the treatment of biodegradable waste. The course includes activities in a team project format. Students will develop plans to perform the proposed experiments. Their realisation will consist in getting acquainted with the operation of selected industrial installations (agricultural biogas plant and municipal waste treatment plant), taking samples for testing and conducting efficiency tests of the analysed processes under laboratory conditions. The concluding stage of the course will be the preparation of reports by the students and discussion of the results and conclusions with the class instructors.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K02] cooperates with other people in the implementation of teamwork, both as a leader and a team member, effectively achieving the assumed goals.	Student interacts with others in the implementation of teamwork, both as a leader and as a member of a team, achieving the set goals effectively.	[SK1] Assessment of group work skills [SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice
	[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.	Student identifies the problems and phenomena related to the recovery of raw materials and energy from biodegradable waste and the applicable concepts, standards and design methods and is aware of their limitations.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[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.	Student plans, prepares and conducts engineering activities for the recovery of raw materials and energy from biodegradable waste, applying practical knowledge and understanding of specific materials, equipment and tools, processes and technologies.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	[K6_U03] designs processes, technologies and systems related to the recovery of raw materials and energy, using appropriate concepts, standards and design methods.	Student designs processes, technologies and systems related to the recovery of raw materials and energy from biodegradable waste.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
Subject contents	The project has been planned as a combination of classes conducted at industrial facilities (at an agricultural biogas plant and a municipal waste treatment facility) and original laboratory classes. The classes will include technological excursions to industrial facilities combined with sampling of biodegradable waste. The collected samples will be used during laboratory work conducted in groups in the laboratories of the WILiŚ KTWiŚ. Students will develop the assumptions of the waste treatment process, select appropriate methods and apply them in laboratory studies. The final stage of the course will be the development of reports by the students and a workshop to summarise the project.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Evaluation of the report	60.0%	100.0%
Recommended reading	Basic literature	Podstawy gospodarki odpadami, Rosik-Dulewska C., wyd. PWN, W-wa 2015	
	Supplementary literature	Kompostowanie odpadów i użytkowanie kompostu, Siuta J., Wasiak G., monografia wyd. IOŚ Technologie Energii Odnawialnej Biogazownie rolnicze, Głazczka A. i in., Multico 2011 Biogas Production, Balagurusamy N., Springer Nature Switzerland AG, styczeń 2021	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Measurement of biogas quantity and composition in reactors with different inputs. Gravimetric analysis of compost.		
Work placement	Not applicable		

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