GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Selected problems of waste management for energy generation, PG_00050171		
Field of study	Mechanical Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Dawidowicz	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

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	30	8.0	62.0	100

Subject objectives

The aim of the course is to acquaint students with the waste management which is the energy use of waste as well as presentation of the physical fundamentals and construction of devices for thermal treatment of waste.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U11] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria	The student is able to design a simple system for energy utilization of waste.	[SU1] Assessment of task fulfilment
[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning	The student is able to make basic estimates and calculations regarding thermal energy conversion.	[SW1] Assessment of factual knowledge

Subject contents

LECTURE Thermal utilization of wastes. Burning and incineration of wastes. Basic constructions of incinerating wastes. Wastes gasification. Example reactions and process gasification types. Pyrolysis of wastes. Example reactions and process pyrolysis types. Construction of pyrolyzers. Plasma decomposition. Examples of plasma installatiosn. Methods of utilization of secondary wastes. LABORATORY Departure to incinerating wastes, preparation of a preliminary design of a line for energy utilization of waste.

Prerequisites and co-requisites

Knowledge of physics, chemistry and thermodynamics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture - Test	56.0%	75.0%
Laboratory - Test	56.0%	25.0%

Recommended reading

Basic literature	1. Piecuch T.: Utylizacja odpadów przemysłowych, Wyd. Ucz. PK, Koszalin 2004. 2. Rybak W.: Spalanie i współspalanie biomasy, Oficyna Wyd. PWr., Wroclaw 2005. 3. Bilitewski B., Härdtke G., Marek K.: Podręcznik gospodarki odpadami. Wyd. Seidel i Przywecki, W-wa, 2006
Supplementary literature	1. Thermal utilization of wastes - conference materials 2. Fuel from wastes - conference materials

	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Definition and purpose of waste gasification. What is alternative fuel? How does methane fermentation work? Objectives of thermal waste utilization.	
Work placement	Not applicable	