



Subject card

Subject name and code	Power Engineering Use of Waste Materials, PG_00039909						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject				2022/2023	
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	3	Language of instruction				Polish	
Semester of study	6	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
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		dr inż. Bartosz Dawidowicz				
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						
Energetyczne wykorzystanie odpadów - Moodle ID: 29690 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29690							
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		6.0		14.0	50
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_U07] is able to design a typical construction of a mechanical device, component or a testing station using appropriate methods and tools, adhering to the set usage criteria		The student makes preliminary estimates and calculations to propose a number of solutions to solve the problem posed in the task.			[SU1] Assessment of task fulfillment [SU4] Assessment of ability to use methods and tools	
[K6_U11] is able to analyse the operation of devices and compare the construction solutions applying usage, safety, environmental, economic and legal criteria		Based on the technical data of devices, processes and technologies, the student selects the appropriate solution to the given problem, meeting the safety, environmental, economic and legal criteria.			[SU3] Assessment of ability to use knowledge gained from the subject		
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 installation. Methods of utilization of secondary wastes. LABORATORY Making estimates and analyzes based on experimental and theoretical data. Departure to incinerating wastes.						
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., Wrocław 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	
Example issues/ example questions/ tasks being completed	1. Mechanism of solid waste incineration.2. Purpose and advantages of waste pyrolysis.3. Methods of energy utilization of sewage sludge.	
Work placement	Not applicable	