



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						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=13138						
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 fulfilment [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., Härdtkke 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 eNauczenie: Energetyczne wykorzystanie odpadów - Moodle ID: 29690 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=29690
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	