

KARTA PRZEDMIOTU

Nazwa przedmiotu	Sustainable Resource Valorization				
Rodzaj przedmiotu	optional	Kod przedmiotu	SDPB0134	Punkty ECTS	1
Formy zajęć i liczba godzin	lecture: 8 h project: 2 h	Dyscyplina naukowa	all disciplines		
Cele przedmiotu	This PhD course explores advanced concepts, technologies, and strategies for the sustainable valorization of resources, with a particular focus on organic and inorganic waste materials, and industrial by-products. It is meant to explain the principles of both traditional and new bio- and thermo-chemical conversion technologies and to discuss the various process routes in relation to the products desired. At the end of the course, students will gain advanced technical knowledge about core processing routes such as anaerobic digestion, fermentation, combustion, gasification, pyrolysis, and hydrothermal conversion, etc. Information about the related product utilization, upgrading techniques and process configurations are also provided. Through lectures, case studies, and project work, students will develop critical skills in process design, innovation, and evaluation of sustainable technologies for real-world applications.				
Treści programowe	types of waste and waste-to-energy; heat and power generation from waste materials; methods and technologies for renewable fuels production in solid, liquid and gaseous forms; utilization of organic municipal waste using bio- and thermochemical conversion technologies; catalytic and high-pressure applications in waste conversion; anaerobic digestion, fermentation, combustion, carbonisation, gasification, pyrolysis, and hydrothermal conversion; (bio-)refineries and (bio-)refinery integration; related engineering calculations.				
Metody dydaktyczne	Lectures will be enriched with student discussions, while project classes will be structured around students' independent research and prepared presentations.				
Forma zaliczenia	Lecture: exam Project: evaluation of completed projects and a final presentation, ongoing progress in the work, discussion and active participation in classes.				
Symbol efektu uczenia się	Zakładane efekty uczenia się		Odniesienie do efektów uczenia się dla kwalifikacji na poziomie 8 PRK	Metody weryfikacji	
EU1	PhD student has a fundamental knowledge of bio- and thermo-chemical conversion technologies,		SD_W1, SD_W2	Exam	

	and knows examining various process routes in relation to desired products		
EU2	PhD student is able to define a research problem that involves bio- and/or thermo-chemical conversion technologies for resource valorization	SD_U1	Project
EU3	PhD student is able to prepare a research plan (processing, characterization) that allows to solve a defined research problem and conduct a critical analysis of the presented solution	SD_U1, SD_U2	Project
EU4	PhD student can participate in a scientific discussion	SD_U6	Project
EU5	PhD student is able to independently plan and implement both individual and team research projects, at the same time inspiring the development of other people	SD_U8, SD_U9	Project

Rozkład godzin lekcyjnych poświęconych na przedmiot	
Wykład / ćwiczenia / projekt / laboratorium / seminarium	8 / 0 / 2 / 0 / 0
Konsultacje	1
Praca własna	10
Przygotowanie do zajęć	4
Suma godzin	25
Punkty ECTS	1

Literatura podstawowa	1. Thermochemical Processing of Biomass Conversion into Fuels, Chemicals and Power, Second Edition, Robert C. Brown (Ed.), ISBN: 978-1-119-41757-6, Wiley, 2019. 2. Recent Advances in Thermochemical Conversion of Biomass, First Edition, Ashok Pandey (Ed.), Thallada Bhaskar (Ed.), M. Stöcker (Ed.) and Rajeev Sukumaran (Ed.), ISBN: 978-0-444-63289-0, Elsevier, 2015. 3. Biofuels Production and Processing Technology, Riazi, M.R., CRC Press, 2018.
Literatura uzupełniająca	1. Integrated Biorefineries, Stuart, Paul R., CRC Press, 2013 2. Cybulski, E. (2009). Plastic conversion processes: A concise and applied guide. CRC Press.
Prowadzący zajęcia	dr hab. Güray Yildiz



Politechnika
Białostocka

Szkoła
Doktorska

Data opracowania programu	28.04.2025
---------------------------------	------------