



Subject card

Subject name and code	Circular economy in the energy sector , PG_00055974						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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	5		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Jacek Maćkinia				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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		2.0		18.0	50
Subject objectives	Understanding the principles of circular economy, applied business models and methods design, policy issues and strategies supporting circular economy, as well as industry applications, including the energy sector. The combination of theoretical knowledge and practical examples aims to equip students with the knowledge and skills needed during the transformation towards a more sustainable and circular economy.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U12] can correctly choose tools (analytical or numerical) to solve engineering problems filtration processes, and data analysis; is able to use photogrammetric and remote sensing tools in engineering tasks in the field of geodetic techniques and metrology	The student is able to choose analytical tools to solve problems in the field of circular economy.	[SU4] Assessment of ability to use methods and tools
	[K6_U10] can use correctly selected methods and measuring devices for determination of basic parameters during the water treatment process and wastewater treatment control; can perform basic laboratory tests leading to the assessment of water quality, pollutant load in wastewater	The student is able to use appropriately selected methods to determine the basic indicators used in circular economy.	[SU4] Assessment of ability to use methods and tools
	[K6_U09] knows and applies the basic provisions of construction law, water law and environmental law; can determine the impact of construction investments on the environment	The student knows the basic regulations in environmental engineering, considering the principles of circular economy.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_W17] has an elementary knowledge on land mechanics, ground science, land reclamation and geotechnics; has basic knowledge about the composition of air, water and soil, environmental pollution and processes responsible for their formation and ways to reduce them, student knows the principles and organization of sustainable resource management within a circular economy	The student knows the principles and organization of sustainable management within circular economy.	[SW1] Assessment of factual knowledge
	[K6_W14] has a theoretical knowledge in the field of chemistry, biology, physics and mathematics including knowledge necessary to understand the technological processes related to water treatment, wastewater treatment, waste management in energy facilities, circular economy	The student has structured and theoretically grounded knowledge in the field of circular economy.	[SW1] Assessment of factual knowledge
Subject contents	Definition and principles of circular economy. Key concepts in circular economy (3R, "from the cradle to the cradle", "from the cradle to the grave"). Business models (regeneration, sharing, optimization, looping, exchange). Design principles (Eco-design and sustainable materials, dismantling and recycling, biomimicry in product design). Policy and regulation (international and national policies supporting the circular economy, regulatory frameworks and standards). Measures and evaluation of circular economy (measurement of circularity, efficiency indicators, assessment of environmental and economic impact. Challenges and opportunities. circular economy in various industries, including the energy sector and waste management.		
Prerequisites and co-requisites	Not applicable.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test comprising lecture materials	50.0%	100.0%
Recommended reading	Basic literature	Carlos Andrade,Sandrine Selosse,Nadia Maïzi. Thirty years since the circular economy concept emerged: has it reached a consensus. [Research Report] Working Paper 2021-02-30.Julian Kirchherr, NanHua Nadja Yang, Frederik Schulze-	
	Supplementary literature	Spüntrup, Maarten J. Heerink, Kris Hartley,Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions,Resources, Conservation and Recycling, 194, 2023,107001, ISSN 0921-3449, https://doi.org/10.1016/j.resconrec.2023.107001 .	
	eResources addresses	Uzupełniające Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	What is the difference between a circular economy and a linear economy? How do materials circulate in Circular Economy? How to measure circularity? What is the relationship between Circular Economy and Life Cycle Assessment (LCA)? What are the benefits and limitations of Circular Economy? Policy and management of Circular Economy EU countries.		
Work placement	Not applicable		