Warsaw University of Technology

COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course	4606-ES-0000AFI-0162	Name of the course	Polish	**Elementy Gospodarki o Obiegu Zamkniętym w Przemyśle Budowlanym**	
			English	**Elements of Circular Economy in the Construction Industry**	
Type of the course	specjalized				
Course coordinator	dr hab. inż. Agnieszka Machowska		Course teacher	dr inż Łukasz Szarek	
Implementing unit	Faculty of Building Services, Hydro and Environmental Engineering	Scientific discipline / disciplines*	environmental engineering, mining and energy, civil engineering, surveying and transportation, architektura I urbanistyka		
Level of education	Doctoral studies	Semester	spring		
Language of the course	English				
Type of assessment	Credit/approval	Number of hours in a semester	15	ECTS credits	2
Minimum number of participants	10	Maximum number of participants	30	Available for students (BSc, MSc)	Yes/~~No~~

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week	1	1	-	-	-
	in a semester	8	7	-	-	-

* does not apply to the Researcher's Workshop

1. Prerequisites

No prerequisites

2. Course objectives

The aim of the course is to introduce students to the basics of the idea of the Circular Economy and carbon footprint and their relevance to the construction industry.

3. Course content (separate for each type of classes)

Lecture

A short introduction to the CE, Zero-waste Coal Power, CE in building materials

Auditory classes

Life cycle mapping an everyday product; Calculate the carbon footprint of different parts of buildings.

4. Learning outcomes

Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			
K01	The student has a basic knowledge of the life cycle of building products and materials.	SD_W02	presentation evaluation
K02	The student has knowledge of the importance of the natural environment for the economy and its threats.	SD_W02	presentation evaluation
Skills			
S01	The student has the ability to obtain information from a variety of sources, is able to analyse it, interpret it, draw conclusions and justify opinions.	SD_U01	active participation during classes; presentation evaluation

S02	The student can interact with others in solving the task at hand.	SD_U04	active participation during classes
Social competences			
SC01	The student is able to interact and work in a group, taking on different roles within it.	SD_K03; SD_K04	active participation during classes
SC02	The student understands the need for life-long learning.	SD_K01	active participation during classes

*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria
The grade is based on student activity during classes and final presentation.

6. Literature
Primary references:
[1] Towards the circular economy. The economic and business rationale for an accelerated transition. Ellen MacArthur Foundation. 2013.
[2] Kledyński, Z., Bogdan, A., Jackiewicz-Rek, W., Lelicińska-Serafin, K., Machowska, A., Manczarski, P., ... & Zubrowska-Sudol, M. (2020). Condition of circular economy in Poland. Archives of Civil Engineering, 66(3).
Secondary references:
[1] Ellen MacArthur Foundation. The Circular Economy Opportunity for Urban and Industrial Innovation in China (Ellen MacArthur Foundation, 2018).
[2] Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy–A new sustainability paradigm?. Journal of cleaner production, 143, 757-768.

7. PhD student's workload necessary to achieve the learning outcomes**		
No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	15
2	Hours of consultations with the academic teacher, exams, tests, etc.	5
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	15
4	Amount of time devoted to the preparation for exams, test, assessments	15
	Total number of hours	**50**
	ECTS credits	**2**

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information	
Number of ECTS credits for classes requiring direct participation of academic teachers	1
Number of ECTS credits earned by a student in a practical course	2