GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Life Cycle Analysis of Building Materials , PG_00048496		
Field of study	Chemistry in Construction Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	
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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Anna Kuczyńska-Łażewska	
	Teachers	dr inż. Anna Kuczyńska-Łażewska	

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

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	43.0	75

Subject objectives

The aim of the course is to learn the theory related to life cycle assessment (LCA) and the principles of life cycle assessment implementation and pro-ecological design of products and technological processes, using specialized software. Familiarize students with the use of LCA software and provide practical skills related to the creation of reports and presentation of results for various recipients.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U04	The student has detailed knowledge and is able to make a critical analysis in the field of technology for the production of materials and products as well as their modification and recycling.	[SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task
K6_W10	The student has knowledge to conducting a life cycle analysis of construction products, taking into account the principles of sustainable development and legal conditions. Is able to identify aspects in which improvement can be made taking into account the above assumptions.	[SW1] Assessment of factual knowledge
K6_K04	The student is able to participate in the preparation of team projects, taking into account economical, ecological and legal aspects.	[SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness [SK1] Assessment of group work skills
K6_U06	The student is able to use specialized software to solve engineering tasks.	[SU4] Assessment of ability to use methods and tools

Subject contents	LECTURE 1. Definition, principles, procedure and application of life cycle assessment (LCA) in determining the environmental impact of technological processes and products. 2. Goal and scope of the ecological life cycle assessment. 3. Analysis of the set of inputs and outputs. 4. Determining data quality and sources. 5. Life cycle impact assessment. 6. Programs and methods. 7. Interpretation of results and examination of completeness. 8. Product Environmental Declaration (EPD) - work on examples. 9. Uncertainty analysis. Monte Carlo method and others. 10. Life cycle cost analysis (LCC). 11. Practical examples of LCA application in industry. LABORATORY EXERCISES 1. Become familiar with creating inventory tables and collecting data from primary and secondary sources. 2. Working with specialized software (SimaPro) and free software (OpenLCA). 3. Self-conducted analysis for a selected case. 4. Presentation of the results and proposals for solving environmental problems. 5. Preparation of a sample EPD
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Project	60.0%	50.0%
Exam	60.0%	50.0%

Recommended reading	Basic literature	1. Norma ISO 14041:2002 Zarządzanie środowiskowe - Ocena cyklu życia - Określenie celu i zakresu oraz analiza zbioru, (2002) 2. Norma ISO 14042:2002 Zarządzanie środowiskowe - Ocena cyklu życia - Ocena wpływu cyklu życia, (2002) 3. Norma ISO 14043:2002 Zarządzanie środowiskowe - Ocena cyklu życia - Interpretacja cyklu życia, (2002) 4. Norma ISO 14040:2009 Zarządzanie środowiskowe - Ocena cyklu życia - Zasady i struktura, (2009) 5. Norma ISO 14044:2009 Zarządzanie środowiskowe - Ocena cyklu życia - Wymagania i wytyczne, (2009)
	Supplementary literature	1. Ciambrone, D. F., Environmental Life Cycle Analysis, CRC Press (2019) 2. Hauschild, M. Z., Rosenbaum, R. K., Olsen, S. I. , Life Cycle Assessment., Springer (2018) DOI: 10.1007/978-3-319-56475-3 3. Simonen, K. , Pocket Architecture: Technical Design Series, Life Cycle Assessment, Routledge, (2014)
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	