Syllabus

Name: Sustainability assessment of processes and products
Name in Polish: Zrównoważona ocena procesów i produktów
Name: in English:

Information on course:

Course offered by department:	Faculty of Organisation and Management
Course for department:	Silesian University of Technology
Study level and form:	Master's degree, Full-time
Term:	Winter semester, 2024/25 and summer semester 2024/2025
Coordinator of course edition::	Dr inż. Jolanta Baran (sem. 2) , dr inż. Agnieszka Janik (sem. 3)

Default type of course examination report:

Credit

Language:

English

Course homepage:

https://platforma.polsl.pl/roz/

ECTS

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Short description:

The aim of the course is the acquisition of the ordered knowledge, skills and competences in the field of basic issues related with the methodology of assessing environmental aspects in a broader perspective of the life cycle of products, processes and organizations. In the first block of classes, the topics discussed focus on the environmental impact assessment of product, while in the second block it covers the assessment of the entire organization in terms of its impact on sustainable development issues.

Description:

Semester 2:

Lecture (15h):

1. Assumptions and principles of assessing the sustainability of products and processes.
2. Life cycle assessment as a method for assessing the potential impact of products on the environment (ISO 14040).
3. Life cycle impact assessment – methodology for assessing life cycle impact according to ISO 14044.
4. Carbon footprint of the organization - scope 1&2 and 3 according to the GHG Protocol and ISO/TR 14069.
5. Product carbon footprint according to ISO 14067.
6. Water footprint according to ISO 14046.
7. Environmental footprint.
8. Product life cycle analysis in business communication.

Laboratory (15h):

1. Introduction to SimaPro.
2. Determination of the functional unit (declared unit) and reference flows, product system boundaries and other parameters for assessing the impact of the selected product's life cycle on the environment.
3. The process of preparation for data collection, data collection and their assignment to a unit process and functional unit.
4. Using databases in SimaPro, including ecoinvent.
5. Modeling of unit processes and life cycle in SimaPro.
6. Classification, characterization, normalization, weighting in SimaPro.
7. Identification of significant issues.
8. Using analysis results in the decision-making process.

Semester 3:

Lecture (15h):

1. Global challenges in the field of sustainable development - environmental performance indicators from The Sectoral Reference Documents (SRDs) on Best Environmental Management Practice, Products and Organization's Environmental Footprint.
2. Responsible Industry – what does it mean? Global challenges in sustainable development.
3. Guidelines for sustainability reporting. Sustainable economic activity in accordance with the requirements of the EU Taxonomy. Stakeholder mapping.
4. Identification of key issues - materiality analysis.
5. G is for Governance - information about management issues in sustainable development reports
6. E is for Environmental - information about the impact on the environment in sustainable development reports
7. S is for Social - information about the impact on society in sustainable development reports

Project classes (30h):

Preparation of a sustainability report for a selected company based on sustainable reporting standards developed by EFRAG.

Number of hours of classes with the direct participation of academic teachers or other persons teaching courses and students:
Contact hours

- Lecture: 30h
- Laboratory: 15h
- Project: 30 h

Student's own work

- Preparation for the final test: 30h
- Preparation of reports from individual laboratory classes: 15h
- Preparation of particular project tasks: 30h

Total workload: 150

Number of ECTS credits: 5, including: 2 ECTS - sem. 2, 3 ECTS - sem. 3

Bibliography:

1. Environmental life cycle assessment of goods and services: an input-output approach / Chris T. Hendrickson, Lester B. Lave, H. Scott Matthews; with Arpad Horvath [et al.]. - Washington : Resources for the Future, cop. 2006.
2. Life cycle assessment handbook: a quide for environmentally sustainable products / ed. by Mary Ann Curran. - Hoboken: Wiley; Beverly, MA: Scrivener Publishing, cop. 2012.
3. Life cycle assessment in industry and business: adoption patterns, applications and implications / Paolo Frankl, Frieder Rubik (ed.); with contributions by Matteo Bartolomeo [et al.]. - Berlin: Springer, 2000.
4. EN ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework, European Committee for Standardization, Brussels.
5. EN ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines, European Committee for Standardization, Brussels.
6. ISO/TR Environmental management — Integrating environmental aspects into product design and development.
7. ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification.
8. ISO/TR 14069:2013 Greenhouse gases - Quantification and reporting of greenhouse gas emissions for organizations - Guidance for the application of ISO 14064-1.
9. World Resources Institute and World Business Council for Sustainable Development (2004). Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard REVISED EDITION.
10. Janik, A., Ryszko, A., Szafraniec, M. Greenhouse Gases and Circular Economy Issues in Sustainability Reports from the Energy Sector in the European Union. Energies 2020, 13, 5993. https://doi.org/10.3390/en13225993.
11. Legal acts regarding sustainable development reporting.
12. European sustainability reporting standards (ESRS) https://www.efrag.org/

Learning outcomes:

KNOWLEDGE:
Student knows and understands:
K2A _W03: Basic processes taking place in the life cycle of technical devices, facilities and systems and their impact on environmental and social issues.
K2A _W04: Ordered and theoretically-grounded key methods of analysis, description and modelling of the conditions of environmental and social and flow of processes in the enterprise and their improvement.

SKILLS:
Student is able to:
K2A _U04: Make a critical analysis of the functioning of existing technical solutions and evaluate them in terms of their impact on the environment and society.
K2A _U08: Integrate and use advanced knowledge related to the field of study of management and production engineering when formulating and solving engineering tasks in the area of sustainable assessment of products and processes.
K2A _U10: Use structured and theoretically-grounded knowledge to implement integrated management systems and production systems, as well as analyse and model processes in the enterprise, taking into account their impact on environmental and social issues
K2A _U12: Communicate on specialist topics ((including, in particular, the environmental impact of processes and products throughout their life cycle) with diverse audiences, act as the debate leader and adequately present and justify different opinions and positions.

SOCIAL COMPETENCE:
Student is ready for:
K2A _K01: Critical evaluation of the acquired knowledge and received content.

Assessment methods and assessment criteria:

Lectures:
• Lectures are passed on the basis of a written test, which consists of closed questions.
• The condition for receiving a positive grade from the lecture is to achieve at least 60% correct answers.
• Two deadlines for corrections in writing are assumed.

Laboratory:
• The laboratory classes are passed by completing five analytical tasks using SimaPro software, excel and word.
• Tasks should be completed in two-person sections.

• Written works (reports) and oral answers are assessed.

Project classes
• All project parts performed in practical classes are assessed.
• Project parts are assessed in terms of formal and content-related aspects.
• Project parts prepared incorrectly can be corrected ones.
• To pass the project classes, it is required to obtain more than 50% of the possible points.

The final grade for the course is the value of the arithmetic mean of the grade for the lecture and the grade for the laboratory classes (sem. 2) and is the value of the arithmetic mean of the grade for the lecture and the grade for the project classes (sem. 3).

Practical placement:

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