STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Ecological evaluation tools		**1010612211010616271**
Field of study **Mechanika i budowa maszyn**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
Elective path/specialty **Product engineering (Inżynieria produktu)**	Subject offered in: **English**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **1** Classes: **1** Laboratory: **1** Project/seminars: **-**		No. of credits **2**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **2 100%** **2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student has a basic knowledge about the questions of environmental impacts of technical objects and technologies, and environmental protection.
2	**Skills**	Student is able to use MS Word, Excel and PowerPoint software (or other similar). He can collect and transform information acquired from Internet or other digital or traditional sources.
3	**Social competencies**	Student is aware of the importance of human activities in relationship with the environment, he understands their general aspects and consequences. He can work in the workgroup, and clearly distribute the tasks. He can do the verbal presentation of the results obtained.

Assumptions and objectives of the course:

Commitment and broadening the knowledge about the environmental impacts of technical objects. History, applications and methodological assumptions of the ecobalancig methods, especially the life cycle assessment (LCA) method. Commitment of the practical skills in the field of ecobalancing analyses preparation and use of the specific environmental software.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student knows the basic kinds of interaction human ? technical object ? environment. - [K2A_W05]
2. He/she knows the main assumptions of the ecobalancing. - [K2A_W06]
3. He/she can name the examples of the ecobalancing methods. - [K2A_W08]
4. He/she knows the specific features of the LCA method, main stages and steps of the LCA method. - [K2A_W10]
5. He/she can describe the main difficulties in the ecobalance?s preparation, especially in relation with LCI phase. - [K2A_W11]
6. He/she knows the basic LCA terminology. He knows the technical life cycle idea. - [K2A_W13]

Skills:

1. Student can describe the main assumptions of the first LCA stage: goal, function and functional unit. - [K2A_U01]
2. He/she can design the life cycle model for the selected objects and processes. - [K2A_U06]
3. He/she can collect and transform the inventory data, he is able to put them to the inventory tables of the specific software. - [K2A_U10]
4. He/she can make the environmental impact assessment using LCIA method. - [K2A_U11]
5. He/she can identify the main sources of the negative environmental impacts in the life cycle of selected technical objects and suggest the directions of the environmental optimization of the technical objects analyzed. - [K2A_U14]

Social competencies:

1. Student can cooperate with others members of the working group. - [K2A_K02]
2. He/she has an increased environmental awareness, resulting from the skillful anticipation of the negative environmental impacts, related with the manufacturing and use of the technical objects. - [K2A_K03]
3. He/she can present the results of the LCA analysis using various presentational techniques. - [K2A_K06]

Assessment methods of study outcomes
Pass on the base of the control work (written test), presentation of the results of the individual or group work.
Course description
Terminology concerning ecobalancing and environmental issues. General questions related with the term of environment (structure, resources, threats). The life cycle of technical objects. History of ecobalances. Methodology of the ecobalances. Application and tools of ecobalances. The examples of the ecobalancing analyses with the particular consideration of the specificity of the operations, potential problems, interpretation. Simplified ecobalances. LCA as the component of LCM. Self-preparation of the environmental analysis of the chosen technical object.
Basic bibliography:
1. Lectures
2. ISO 14040:2009 Environmental management - Life cycle assessment - Principles and framework
3. ISO 14044:2009 Environmental management - Life cycle assessment - Requirements and guidelines
4. Goedkoop, M.; Spriensma, R.S., The Eco-indicator 99, a Damage oriented method for LCIA, Ministry VROM, the Hague 1999
Additional bibliography:
1. Additional bibliography: Baumann H., Tillman A.: The Hitch Hiker?s Guide to LCA. An orientation in life cycle assessment methodology and application Sweden, 2004, ISBN ISBN 91-44-02364-2
2. The International Journal of Life Cycle Assessment

Result of average student's workload

Activity	Time (working hours)
1. Attendance at the lectures	15
2. Review of the lectures	7
3. Consultations	6
4. Test preparation	6
5. Test attendance	2
6. Preparation to the laboratories	2
7. Attendance at the laboratories	15
8. Project preparation	15

Student’s workload

Source of workload	hours	ECTS
Total workload	68	2
Contact hours	38	1
Practical activities	0	0