



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Ecological evaluation tools

### Course

Field of study

Mechanical and Automotive Engineering

Area of study (specialization)

Product Engineering

Level of study

Form of study

Year/Semester

1/1

Profile of study

Course offered in

english

Requirements

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

dr inz. Jędrzej Kasprzak

email:jędrzej.kasprzak@put.poznan.pl

Institute of Transport

T : +48616652232, F : +48616652736

Piotrowo 3 Street, 60-965 Poznan

Responsible for the course/lecturer:

### Prerequisites

Knowledge: Student has a basic knowledge about the questions of environmental impacts of technical objects and technologies, and environmental protection

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



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.

### **Course objective**

Commitment and broadening the knowledge about the environmental impacts of technical objects. History, applications and methodological assumptions of the ecobalancing 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

### **Course-related learning outcomes**

#### Knowledge

He knows the modern engineering methods of computer graphics and the theoretical basis of engineering calculations using the finite element method.

Has knowledge of the principles of safety and ergonomics in the design and operation of machines and the threats that machines pose to the natural environment.

Has extended knowledge of modern construction materials such as carbon plastics, composites, ceramics, in terms of their construction, processing technology and applications.

#### Skills

He can estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group.

Can interact with other people as part of teamwork and take a leading role in teams.

He is able to independently plan and implement his own learning throughout life and direct others in this regard.

#### Social competences

He is ready to critically assess his knowledge and received content.

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.

It is ready to initiate actions for the public interest.

### **Methods for verifying learning outcomes and assessment criteria**

Learning outcomes presented above are verified as follows:

Pass on the base of the control work (written test), presentation of the results of the individual or group work

### **Programme content**

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.

### Teaching methods

Lecture: multimedial presentation, illustrated with examples on the board

Laboratories: individual exercises supported by the dedicated software, done under the supervision of subject caretaker

### Bibliography

Basic

1)Lectures - multimedial presentations

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

5)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

6)"The International Journal of Life Cycle Assessment

### Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for tests, preparing for tutorials, consultation) <sup>1</sup>	30	1,0

<sup>1</sup> delete or add other activities as appropriate