COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ecodesign [S2TIIZM1E>EKO]

Course

Field of study
Information Technology for Smart and Sustainable Mobility

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
15

Number of credit points

3,00

Coordinators

dr inż. Jędrzej Kasprzak
jedrzej.kasprzak@put.poznan.pl

Lecturers

Prerequisites

Knowledge: Student has a basic knowledge about mechanical and vehicle construction and the questions of environmental impacts of technical objects and technologies, and environmental protection Skills: Student is able to create a system diagram, select its components, and perform basic calculations; is able to assess material, environment, and workload in the assembly of a simple machine; and is able to organize and manage the design process of an uncomplicated machine. Social competences: Student is aware and has an understanding of the importance and impact of non- technical aspects of professional activity, its influence on the environment, and responsibility for one’s own decisions.

Course objective

Gaining proficiency in the approach to product design, with particular emphasis on the environmental impact of the product throughout its entire life cycle. Development and supervision of engineering tasks aimed at reducing the consumption of materials and energy in the design process.

Course-related learning outcomes

Knowledge:

1. The student possesses advanced and in-depth knowledge in the field of transport engineering, including theoretical foundations, tools, and means used to solve basic engineering problems, in particular, they are familiar with the fundamental assumptions, principles, and procedures of ecodesign
2. The student has knowledge of development trends and the most significant recent achievements in the design of machines and means of transport
3. The student has advanced and detailed knowledge of the processes occurring throughout the life cycle of machines and means of transport

Skills:
1.The student is able to obtain information from literature, databases, and other sources, integrate it, interpret and critically evaluate it, draw conclusions, and formulate well-justified opinions in the area of environmental impact assessment throughout the life cycle
2. The student is able to use information and communication technologies applied in the design of machines and devices
3. The student is able to critically analyze existing technical solutions and propose their improvements (enhancements) in terms of design modifications.
4. The student is able to collaborate within a team, taking on various roles, including leading a team

Social competences:
1. The student is prepared to critically assess their knowledge and understands that in transport engineering, knowledge and skills become outdated very quickly
2. The student understands the importance of using the latest knowledge in the field of machine and equipment design
3. The student understands the importance of dissemination activities related to the latest achievements in machine and equipment design and 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:

Passing on the basis of audit work (written test - 4-5 open questions and test questions), presentation of the results of individual or group work (project concerning the implementation of assumptions for the ecodesign of a selected technical object).

Programme content

Eco-design definition. Key principles and procedures of ecodesign, its link to traditional design, tools based on life-cycle thinking.

Course topics

1. Basic assumptions of eco-design.
2. Relationship with the traditional design perspective.
3. Eco-design principles.
4. Eco-design procedure.
5. Eco-design tools based on the principle of life-cycle thinking.
6. Examples of eco-design (case studies).
7. Eco-design framework for selected machine categories.

Teaching methods

Lecture and tutorials: multimedial presentation, illustrated with examples.
Project: individual and group project cases supported by the dedicated software, carried out under the supervision of teacher.

Bibliography

Basic:
Kauffmann J., Lee K-M. Handbook of Sustainable Engineering. Springer Ed. 2013
Wimmer W., Lee K.M. Polak J., Quella F., Ecodesign - the competitive advantage. Ed. Springer, 2010
Wimmer W., Zust R., Lee W K.M., ECODESIGN Implementation. A Systematic Guidance on Integrating Environmental Considerations into Product Development. Ed. Springer, 2004.

Yeang K., Ecodesign - a manual for ecological design. Wiley 2008

Additional:
Wimmer W., Züst R., Lee K.-M. (2004): Ecodesign Implementation ? A Systematic Guidance on Integrating Environmental Considerations into Product Development, Dordrecht, Springer
Journal of Industrial Ecology - review of the annuals
Journal of Engineering Design - review of the annuals

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00