COURSE DESCRIPTION CARD - SYLLABUS

Course name
Ecodesign [S2MiBP1E-PE>EProj]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
1/2

Area of study (specialization)
Product Engineering

Profile of study
general academic

Level of study
second-cycle

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other (e.g. online)
0

Tutorials
0

Projects/seminars
15

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

Knowledge: Basic knowledge of the basics of machine design and the theory of machines and mechanisms. Basic, structured knowledge of metal materials used in machine construction. Basic knowledge of production techniques used in the engineering industry. Basic knowledge of the machine life cycle, recycling of machine elements, construction materials and consumables. Basic knowledge of machines and technologies affects the natural environment and global energy balance. Skills: Ability to prepare technical documentation (descriptive and graphic) of an engineering task. Ability to create a system diagram, select its elements and perform basic calculations. The possibility of browsing catalogs and websites of manufacturers of machine elements for ready parts for use in own projects. Ability to assess material, environment and workload on the assembly of a simple machine. The ability to organize and manage the design process of an uncomplicated machine. Social competences: Awareness and understanding of the importance and impact of non-technical aspects of mechanical engineering activities and its impact 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 of machines.

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.
He can advise on the selection of machines for the technological line as part of the specialization.
Can interact with other people as part of teamwork and take a leading role in teams.

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.
Is willing to think and act in an entrepreneurial manner.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Learning outcomes presented above are verified as follows:
Pass based on the audit work (written test - 4-5 open questions), presentation of the results of individual or group work (project regarding the implementation of assumptions for designing the life cycle of a selected technical object).

Programme content

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

Course topics

Lectures:
1. ECO-DESIGN - INTRODUCTION. DEMANDS FOR ENVIRONMENTAL INFORMATION
2. SUPPLY OF ENVIRONMENTAL INFORMATION FOR DECISION SUPPORT
3. ECO-DESIGN AS A DESIGN/DECISION MAKING SUPPORT. TOOLS OF ECODESIGN
4. ECO-DESIGN IN PRACTICE – BUSINESS RESPONSE, CHALLENGES, CASE STUDIES
5. ECO-DESIGN STRATEGIES - STRATEGY WHEEL I
6. ECO-DESIGN STRATEGIES - STRATEGY WHEEL II
7. ECO-DESIGN STRATEGIES - STRATEGY WHEEL III
8. Final evaluation

Project:
1. PROJECT CONTENT DESCRIPTION
2. ECODESIGN PILOT - GENERAL OVERVIEW. INTRODUCTION
3. ECODESIGN PILOT - PRELIMINARY DIAGNOSIS - ASSISTANT
4. ECODESIGN PILOT - INCREASING ENVIRONMENTAL PERFORMANCE - PILOT
5. CONSULTATIONS ON THE SUBJECT AND CONTENT OF THE PROJECT
6. CONSULTATIONS ON THE SUBJECT AND CONTENT OF THE PROJECT

7. CONSULTATIONS ON THE SUBJECT AND CONTENT OF THE PROJECT

Teaching methods

Lecture: multimedial presentation, illustrated with examples on the board
Projects: individual and group project cases supported by the dedicated software, done under the supervision of subject caretaker

Bibliography

Basic
Lectures - presentations.
Kauffmann J., Lee K-M. Handbook of Sustainable Engineering. Springer Ed. 2013
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	50	3,00
Classes requiring direct contact with the teacher	30	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00