



RTU Course "Ecodesign"

11509 Vides aizsardzības un siltuma sistēmu katedra

General data

Code	EAS502
Course title	Ecodesign
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Environmental Engineering and Management
Responsible instructor	Gatis Bažbauers
Academic staff	Jana Simanovska
Volume of the course: parts and credits points	1 part, 4.0 Credit Points, 6.0 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Maximum auditorium capacity	50
Maximum number of students per semester	50
Abstract	The aim of the study course is to introduce with life cycle approach and thinking in the process of product design and main principles of ecodesign. Guidelines of ecodesign which allow to consider and reduce the factors of environmental impact arising during life cycle of products are reviewed in the course. Qualitative and quantitative methods for estimation of environmental impact created by product systems as well as comparison and estimation of environmental performance caused by various design solutions of the products are taught.
Goals and objectives of the course in terms of competences and skills	During the course students will learn application of methods for determination of environmental impact of product systems and the main principles of ecodesign which will allow them to perform practical analysis of various product design solutions by considering critical parameters of environmental impact during the whole life cycle and work out suggestions for improvement of environmental performance of the products. In conclusion, students will be able to formulate recommendations.
Structure and tasks of independent studies	Literature research work for product eco-design development. Practical work on carrying out product life cycle analysis and formulate recommendations, using different methods e.g. Ecodesign PILOT. Practical work on taking noise and vibration measurements. The goal of independent studies is to develop skills to define ecodesign tasks and choose appropriate strategies to reach targets, to acquire skill to use different ecodesign tools and determine compliance of products with legislation and criteria for awarding an ecolabel. Using knowledge obtained during the course, students prepare course work carrying out the ecodesign of certain product system.
Recommended literature	<ol style="list-style-type: none"> 1. Otto K.N., Wood K.L., Product Design, Techniques in Reverse Engineering and New Product Development, Prentice Hall, 2001, ISBN 0130212717. 2. Ekodizaina rokasgrāmata, SIA Vides vadības tehnoloģijas, Rīga, 2006. 3. Mechanical Life Cycle Handbook, Good Environmental Design and Manufacturing, edited by Mathendra S.Hundal, Marcel Dekker, Inc., 2002. 4. Wimmer, W., Züst R., Ecodesign Pilot, Kluwer Academic Publishers, 2001. 5. Wimmer, W., Züst R. and Lee, K., Ecodesign Implementation, Springer, 2004. 6. Volland, Gerard, G.S. Engineering by design, Addison Wesley Longman, Inc., 1999. 7. National Research Council Canada, IRAP-Industrial Research Assistance Program, "Design for Environment Guide" 2003-01-220, http://dfe-sce.nrc-cnrc.gc.ca. 8. The Global Development Research Center, The WWW Virtual Library: Urban Environmental Management; contact: Hari Srinivas; www.gdrc.org. 9. The Eco-indicator 99. A damage oriented method for Life Cycle Impact Assessment. Methodology Report. PRé Consultants. Third edition, 22 June 2001. 10. http://www.ecodesign.at/pilot.
Course prerequisites	Ecology and environmental protection

Course outline

Theme	Hours
Lect.1. Environmental impact of products. Consumerism. Integrated product policy	2
Pract.w.1. Life cycle approach and thinking. Relation between product's environmental impact	2
Lect.2. Extended producer responsibility. Definition of ecodesign	2
Pract.w. 2. Role play: Requirements from stakeholders. Ecodesign implementation, pros and cons, external and internal	2
Lect. 3. Internal and external stimuli for ecodesign implementation. Implementation of ecodesign in enterprise, examples	2
Pract.w.3. Product's life cycle, functional unit, process tree	2
Lect. 4. Product modelling. Quantitative and qualitative methods for environmental impact assessment	2
Pract.w. 4. MET (Materials, Energy, and Toxicity) Matrix - tool used to evaluate various environmental impacts of a prod	2
Lect.5. Formulation of ecodesign tasks. Review of ecodesign strategies according to the strategy wheel. Ecodesign strate	2
Pract.w.5. Introduction to Eco-indicator 99 method - impact assessment method for "screening" LCA and a pragmatic ecodes	2

Lect.6. Ecodesign strategy: physical optimisation (strategy No.2)	2
Pract.w.6. Disassemble and analysis of product, conformity assessment to ecodesign strategies No.1 and No.2.; creation o	2
Lect.7. Ecodesign strategy: material optimisation (strategy No.3)	2
Pract.w. 7. Material selection, environmental impact	2
Lect.8. Ecodesign strategy: optimisation of production (strategy No.4)	2
Pract.w.8. Disassemble of product, conformity assessment to ecodesign guidelines - Design For Assembly (DFA) and Design	2
Lect.9. Ecodesign strategy: optimisation of distribution systems (strategy No.5)	2
Pract.w.9. Environmentally friendly packing	2
Laboratory work: Noise and vibration measurements	4
Lect.10. Ecodesign strategy: reduction of environmental impact during the use phase (strategy No.6)	2
Pract.w.10. Energy-using products, environmental impact of products across the product life cycle	2
Lect.11. Ecodesign strategy: optimisation of end-of-life stage (strategy No.7)	2
Pract.w.11. Product structure - a hierarchical decomposition of a product, typically known as the bill of materials (BOM	2
Lect.12. Ecodesign and its relation to other initiatives of sustainable development and safety of work environment	2
Pract.w.12. Ecodesign PILOT – practical, easy-to-use software tool for identification and application of ecodesign measu	2
Lect.13. Ecodesign implementation plan. Communication of environmental performance of products: eco-labelling, energy la	2
Pract.w.13. Ecolabels. Product analysis, ecodesign probability, analysis of results, notification of product manufacture	2
Research topics in ecodesign, challenges and future development. Summary of the course, questions, discussions. Defence	8

Learning outcomes and assessment

Learning outcomes	Assessment methods
To be able to define ecodesign tasks and choose appropriate strategies.	Examination: Practical works, course work, exam. Assessment criteria: is able to analyse product, evaluate accordance to ecodesign guidelines; is able to create ecodesign ideas.
To be able to evaluate products accordance to ecolabel criteria and provisions of law.	Examination: Practical works, course work. Assessment criteria: is able to determine products compliance with the law and criteria for awarding an ecolabel.
To be able to use ecodesign tools.	Examination: Practical works, course work. Assessment criteria: is able, using different ecodesign tools, formulate recommendations and determine optimization tasks.
To be seized of quantitative and qualitative methods for environmental impact assessment.	Examination: Practical works, course work, exam. Assessment criteria: is able, using MET matrix and Ecoindicator method, analyse environmental impact of product, is able to accomplish comparison.
To be able to come forward with ecodesign ideas and specify areas for improvements.	Examination: Practical works, course work, exam. Assessment criteria: is able, using knowledge obtained during the course, carry out the product ecodesign.

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	4.0	6.0	2.0	2.0	0.0		*	