

# Resource Efficient Products

Programme course

6 credits

Resurseffektiva produkter

TKMJ29

Valid from: 2017 Spring semester

**Determined by**  
Board of Studies for Mechanical  
Engineering and Design

**Date determined**  
2017-01-25

## Main field of study

Energy and Environmental Engineering, Product Development, Mechanical Engineering

## Course level

Second cycle

## Advancement level

A1X

## Course offered for

- Design and Product Development
- Mechanical Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Industrial Engineering and Management, Master's programme
- Sustainability Engineering and Management, Master's programme
- Applied Physics and Electrical Engineering - International, M Sc in Engineering

## Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

## Prerequisites

Environmental engineering and knowledge about product development required in ordinary engineering programs

## Intended learning outcomes

The course will give students an understanding of how to realize the potential for more resource-efficient and thereby less environmentally-demanding products. This is achieved by taking the lifecycle perspective as a starting point and utilizing relevant design, material and production choices. Upon successful completion of the course, a student should be able to do the followings in English:

- Understand and describe the connection between our society's use of products and resources and environmental related problems.
- Understand and describe basic concepts such as lifecycle perspective, environmental effect, sub-optimization, functional unit, sustainable development, eco-design, greenhouse effect and precautionary principle.
- Use and understand methodological tools such as Disassembly Analysis, checklists (e.g. Eco Strategy Wheel), and Quality Function Deployment for Environment.
- Understand the concepts of Life Cycle Assessment and interpret results from a Life Cycle Assessment.
- Understand and use some general strategies for improving resource efficiency of products.
- Apply the course's content in the analysis of an existing product (on the market) from resource efficiency and environmental perspectives. This will produce general resource efficiency and environmentally-related improvement suggestions. Furthermore, it will require the identification and analysis of basic energy-, material- and environmentally-related product requirements.

## Course content

Review of overall concepts such as lifecycle perspective, environmental effect, sub-optimization, functional unit, system boundaries, sustainable development, eco-design, greenhouse effect and precautionary principle. Basic introduction to Life Cycle Assessment methodology. Some methods and tools for resource efficient product development, theory and practice of e.g. Disassembly Analysis, checklist, QFD for Environment.

Mandatory group project work where the students, given an existing product (on the market), apply theory and methodology from the course to analyze and provide general resource- and environmentally-related improvement suggestions. This will include the identification and analysis of basic energy-, material- and environmentally-related product requirements.

## Teaching and working methods

Instruction is given in the form of lectures and project work. Course grades are determined based on the written exam and the written report (and possibly an oral presentation) by each project group.

## Examination

|      |                     |           |            |
|------|---------------------|-----------|------------|
| LAB1 | Laboratory work     | 3 credits | U, G       |
| TEN1 | Written examination | 3 credits | U, 3, 4, 5 |

## Grades

Four-grade scale, LiU, U, 3, 4, 5

## Other information

Supplementary courses: Integrated Product Service Engineering

## Department

Institutionen för ekonomisk och industriell utveckling

## Director of Studies or equivalent

Niclas Svensson

## Examiner

Tomohiko Sakao

## Course website and other links

<http://www.iei.liu.se/envtech/utbildning/kurser?l=en>

## Education components

Preliminary scheduled hours: 36 h

Recommended self-study hours: 124 h

## Course literature

Compendium "Resource Efficient Products 2014", IEI / Environmental Technology and Management

## Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at [http://stydokument.liu.se/Regelsamling/Innehall/Utbildning\\_pa\\_grund-\\_och\\_avancerad\\_niva](http://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).