

# Industrial Ecology

Programme course

6 credits

Industriell ekologi för ökad resurseffektivitet

TKMJ35

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

## Course level

First cycle

## Advancement level

G2X

## Course offered for

- Energy-Environment-Management M Sc in Engineering
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, 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 Technology

## Intended learning outcomes

The course aims at developing the participants' understanding of a proactive approach to the prevention of environmental impact from products, organisations and technical systems. This will be accomplished since the participant will be able to;

- evaluate environmental impact from material and energy flows in a life cycle perspective based on thermodynamics and suggest improvements with the awareness of the risk for problem shifting
- apply material strategies such as dematerialisation, substitution and waste hierarchies regarding different products
- describe the usability of different tools and strategies for optimising material and energy flows in a life cycle perspective
- describe and use life cycle assessment to quantify environmental impacts from a system,
- search and analyse information regarding a societal environmental problem, propose realistic system approaches for increased resource efficiency and present the results both orally and in written form.

## Course content

- Material strategies with special emphasis on waste and recycling: Waste management in practice, Waste hierarchy, Reuse, Material and Energy recycling, Land-fills, Urban and Land-fill mining, Resource dissipation, Exergy and entropy, Dematerialisation, Transmaterialisation, Material and substance selection, Service-life, Use of by-products, Producers' responsibility
- Tools and concepts for environmental systems analysis with special emphasis on material flow analyses: Problem shifting – tool selection, Material flow analyses, Total material requirement, Direct material input, Material intensity per service, Ecological rucksacks, Ecological footprint, Substance flow analyses, Life-cycle assessments
- Urban and landfill mining, waste hierarcies, exergy and entropy
- Business dimensions and insights into the conditions for a company in the recycling business

## Teaching and working methods

Lectures, guest lectures, literature seminars and different forms of group exercises

## Examination

UPG1	Assignments	2 credits	U, G
TEN1	Written examination	4 credits	U, 3, 4, 5

Active involvement in group exercises

## Grades

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

## Department

Institutionen för ekonomisk och industriell utveckling

## Director of Studies or equivalent

Niclas Svensson

## Examiner

Niclas Svensson

## Course website and other links

## Education components

Preliminary scheduled hours: 48 h

Recommended self-study hours: 112 h

## Course literature

Vetenskapliga artiklar och rapporter

## 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).