

# Efficient Industrial Energy Systems

Programme course

6 credits

Effektiva industriella energisystem

TMES31

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, Mechanical Engineering

## Course level

First cycle

## Advancement level

G2X

## Course offered for

- Energy-Environment-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

Sustainable energy systems, Building energy systems

## Intended learning outcomes

The overall aim of the course is to provide a systems perspective on energy supply and energy demand in different types of industrial systems with focus on energy efficiency. After completion of the course the student is to be able to:

- Describe, explain and illustrate overall structure and development of industrial energy use and the influence on its environment
- Describe and discuss the function of different industrial processes and their energy use
- Describe and critically use unit process categorization of energy demand
- Critically review and carry out industrial energy audits
- Describe and reflect upon different types of measures and their potentials within industrial energy systems
- Describe and reflect upon systems consequences from measures on the supply and demand side within industrial energy systems

## Course content

Structure, development and environmental consequences of industrial energy use, industrial use within Sweden and globally, analysis and estimations of potentials for energy efficiency measures, unit processes, production and support processes, technology development, energy economizing, energy effectiveness, industrial clusters, energy storage, load management, fuel conversion, energy audits, energy management

## Teaching and working methods

The course is given in the form of tutorials, seminars and computer lab. In connection to some learning moments there are also compulsory tasks.

## Examination

UPG2	Seminar work	1 credits	U, G
UPG1	Project work	1.5 credits	U, G
TEN1	Written examination	3.5 credits	U, 3, 4, 5

## Grades

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

## Other information

Supplementary courses: Bachelor Thesis - Energy and Environment Engineering, Modeling of energy systems, Strategic development of sustainable energy systems, Analysis and modelling of industrial energy systems, Energy Planning and Modelling of Communities, Energy Policy Instruments, International energy markets, Project Course Advanced- Energy Engineering.

## Department

Institutionen för ekonomisk och industriell utveckling

## Director of Studies or equivalent

Shahnaz Amiri

## Examiner

Magnus Karlsson

## Course website and other links

<http://www.iei.liu.se/energi/utbildning/tmes31-industrial-emm/tmes31-emm-industrial?l=sy>

## Education components

Preliminary scheduled hours: 40 h

Recommended self-study hours: 120 h

## Course literature

Skrifter från Energisystem, IEI

## 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).