Industrial Energy Systems

Programme course

6 credits

Industrial Energy Systems

TMES21

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
Second cycle

Advancement level
A1X

Course offered for
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Sustainability Engineering and Management, Master's programme

Specific information
May not be included in the same degree as TMES09, TMES17 and TMES31

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
Energy Systems

Intended learning outcomes

This course aims at providing knowledge about industrial energy systems. The course considers both supply and demand side aspects and focus at providing knowledge concerning the connection of the use of energy and industrial production. Energy surveys, energy saving potentials and the industrial energy use, and its significance for example for the environment, are considered. The aim is also to provide knowledge of computational tools for analysing industrial energy systems from a systems point of view and give an understanding for the industrial building as an energy system. After the course the students should:

- Have a good understanding of the connection between the supply and demand sides of industrial energy systems
- Have acquired knowledge about different possibilities to influence the energy demand and the corresponding costs
- Have become familiar with the energy demand for both support and production processes and their interrelation
- Have become familiar with methods for industrial energy system analysis
- Have acquired knowledge about the structure and development regarding the use of energy

Course content

Industrial energy usage and environmental consequences; Industrial energy usage in Sweden and an international outlook; The industry and deregulated energy markets (especially the electricity market); Relations between industrial production and energy use; Energy surveys and forecasting; Industrial economy and energy use; Energy use within different production processes (unit processes); Production planning and buffers in the production (conversion, efficiency measures, load management and energy storage); Energy management (barriers to and drivers for energy efficiency); Systems analysis and modelling; Industrial project (energy survey and measures carried out within a virtual industrial plant).

Teaching and working methods

The course is given in the form of lectures, tutorials, seminars, project and laboratory work.

Examination

TEN1	Written examination	3.5 credits	U, 3, 4, 5
LAB1	Laboratory work	1 credits	U, G
PRA1	Project work	1.5 credits	U, G

Grades

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

Department
Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent
Shahnaz Amiri

Examiner
Mats Söderström

Course website and other links

Education components
Preliminary scheduled hours: 36 h
Recommended self-study hours: 124 h

Course literature
Introduction to Energy Analysis, utdelat material

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://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.