



# MJ1141 Energy Systems and Sustainability 9.0 credits

## Energisystem och hållbar utveckling

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for MJ1141 valid from Autumn 2019

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Mechanical Engineering, Technology

## Specific prerequisites

MJ1112 Applied Thermodynamics, MJ1145 Energy systems, ME1301 Industrial management, advanced course, ME2302 Knowledge formation in technology and natural science

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

On completion of the course, the student should be able to:

### Knowledge and understanding

describe the different parts (technology) of the energy system based on a division into energy use, distribution and production, as well as be able to account quantitatively (roughly, as a percentage) for which functions and services in the society that need/cause extraction of primary energy.

account for Sweden's development in the energy field since the 1970s and identify important strategic decisions that have influenced the energy systems of today, as well as for different types of policy instruments and their importance for introducing new technology in the energy system.

describe the different actors of the energy system (and their roles) based on a division into energy use, distribution and production, and identify and discuss energy-related technical challenges in Sweden, Scandinavia and Europe

### Competence and skills

present ones work both orally and in writing in a professional and convincing way

under time pressure develop and present (in a convincing way) a new innovative business idea in collaboration with an external employer (case task)

### Judgement and approach

identify, discuss and critically evaluate energy and sustainability related issues in today's society

identify, evaluate and communicate the consequences of future technology choices in the different parts of the energy system, as well as clearly account for examples of actor related goal conflicts in the energy system

## Course contents

The course MJ1141 Energy systems and sustainable development give a broad introduction to the energy system and its technology and sustainability challenges. The course adopts a system perspective, and the different actors of the energy system are revealed. Technical and commercial innovation is a theme throughout the course.

## Disposition

The course is divided into four parts:

- Energy systems, specialised system theory

- Energy systems, innovation and enterprise
- Energy systems, Power grids
- Energy and sustainable development

## Course literature

Möjligheter och dilemman, IVA´s Energibok

Diverse rapporter och artiklar

Fördjupad litteratur om systemanalys och system teori.

Litteratur om energy policy och energimarknad

Den exakta litteraturen meddelas vid kursstart

## Examination

- FÄL1 - Field Exercise, Study Visits, 1.0 credits, grading scale: P, F
- PRO1 - Project, Strategies, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- PRO2 - Project, Strategy, 2.0 credits, grading scale: P, F
- PRO3 - Project, strategy, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- SEM1 - Seminar, The Energy System, 1.0 credits, grading scale: P, F
- SEM2 - Seminar, Sustainability and Energy, 1.0 credits, grading scale: P, F
- TEN1 - Oral exam, Sustainability and Energy, 2.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

The final grade is calculated based on the mean of the three items with A-F grades as well as passed (P) on other. Exact calculation of the grade will be stated in the course memo.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.