MJ1145 Energy Systems 7.5 credits

Energisystem

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 MJ1145 valid from Spring 2020

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

MJ1112 "Applied Thermodynamics", SK1110 "Electromagnetism and Waves", or the equivalent,
EI1120 Electrical Circuit Analysis for the Environment and Energy Program, or the equivalent.

Language of instruction

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

Intended learning outcomes

After the course, the student should be able to:

1. Describe and analyse environmental effects of transports

2. Describe and analyse dynamic simulation and modelling of the energy use of a building

3. Describe and analyse simulation and modelling of integration of solar cells in the electricity grid as well as analysis of what happens when a cloud covers the area

4. Describe and analyse simulation and modelling of combined heat and power production (CHP) in part of a city and optimisation of electricity and heating

5. Describe and analyse the energy situation in a country

Course contents

The course gives:

- Basic system theory and applications of this on modelling and simulation of energy systems in different scales and different time scales,

- methods to measure and calculate the benefit/efficiency of the energy system, as well as tools to be able to discuss short-term and long-term sustainability in energy systems

- Basic knowledge of how different components in the energy systems interact

a special focus on (in) the connection between wind energy and integration in the electric power system, (ii) energy systems in the city (district heating/cooling and CHP), (iii) energy use in society as well as (iv) energy use for transports.

- A comparison of energy systems in different countries and economies with regard to efficiency, technologies, fuels and environmental impact.

Course literature

Meddelas vid kursstart

Examination

- PRO1 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO2 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F

- PRO3 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO4 - Project, 1.5 credits, grading scale: A, B, C, D, E, FX, F
- PRO5 - Project, 1.5 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.

Other requirements for final grade

The course is divided into five items PRO1-PRO5. It is required pass all course components (1-5) to pass the course. Each item are worth 1.5 credits and is graded. Final mark is calculated as a mean with rounding up.

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.