MJ2413 Energy and Environment 6.0 credits

Energi och miljö

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

Establishment

On 22/04/2022, the Dean of the ITM School has decided to establish this official course syllabus to apply from autumn term 2021 (registration number M-2022-0609).

Grading scale

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

Education cycle

Second cycle

Main field of study

Environmental Engineering

Specific prerequisites

Degree of Bachelor (Master of Science in Engineering) 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 passing the course, the student should be able to:

1. Describe and differentiate between the main/the large energy conversion processes, connect them to their resource needs and their influence on air, water, soil, flora and fauna, and people, as well as differentiate between applications in industrial nations and developing countries
2. Analyse how alternative configurations/compositions of the energy system as a whole (from resource extraction to end use of energy services) can relate to sustainability in general, and interact with the global sustainability goals in particular
3. Describe, and differentiate between, established assessment tools for environmental consequences, such as environmental impact assessment (MKB/EIA) and life-cycle analysis (LCA) and evaluate the results of such assessments
4. Describe and discuss global trends for the use of different energy technologies (renewable and fossil) and connect these trends to ongoing political processes and international technology and market development
5. Explain the underlying logic in key concepts in energy economy modelling, including demonstrate the ability to calculate key parameters via mathematical formulations, such as energy balances

ILO6: Plan and carry out an extensive 3E (Energy-Economy-Environment) modelling study with the concepts and tools that are included in the course and include relevant technical, financial, social and environmental aspects. This includes to create a scenario analysis with an energy alternatives tool (LEAP, OSeMOSYS or the like) that model a reference energy system from resource extraction to final power need

Course contents

Lectures that are given by a varying number of experts represent the essential parts of a subject area and also give a framework for further in-depth studies via a group project. A laboratory exercise where the students use an energy economy forecasting program LEAP, is included in the course. Also study visits are included in the course.

Examination

- PROA - Project, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TENA - Written exam, 3.0 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.

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

Other requirements for final grade

Project (PRO1), 3.0 credits: Includes project description, written report, public discussion and peer review of another group, as well as oral reporting at final seminar. The grade A-F is given as grade for the group

Examination (TEN1), 3.0 credits. The grade A-F is given individually

For final mark, the grades from project and examination are weighted.

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.