KE2140 Energy Systems Analysis 7.5 credits

Energisystemanalys

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 KE2140 valid from Spring 2011

Grading scale

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

Education cycle

Second cycle

Main field of study

Chemistry and Chemical Engineering

Specific prerequisites

Admission requirements for independent students:
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding. Documented proficiency in English corresponding to English B.

Admission requirements for programme students at KTH:
At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2,

and bachelor's work must be completed, within a programme that includes:
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

Language of instruction

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

Intended learning outcomes

Give an understanding of:

- the technology
- the energy sources and resources
- the processes
- to some extent the economics and policy that lies behind the present energy system of the world and what possible paths there are for the future.

Give an understanding of the concept “energy system design”:

Make the student familiar with some methods for the evaluation of energy systems, like pinch technology, Markal modeling etc.

After completion of this course, the students should be able to:

- Understand and evaluate different scenarios of energy supply, including fossil-fuelled, nuclear and renewable-based supply
- Recognize the development of and constraints on carbon- and non carbon-based energy resources
- Understand the importance but also the constraints on end-use efficiency of energy
- Be familiar with the problems of energy distribution and the constraints on the distribution systems of today.
- Critically analyse competing possibilities in the energy sector
- Evaluate options for energy supply, distribution and utilisation
- Explain and compare environmental sustainability aspects of energy systems
- Analyse and criticise the interaction between technical and economic aspects in the development of the energy system
- Be able to understand and describe the current situation concerning climate change and policies related to that
- Be familiar with basic concept for the design of an energy system
- Understand the concepts of analysis of energy system presented in the course (pinch technology, Markal modelling etc)
- Be able to perform simple calculations using the methods for analysis.

Course contents

Seminars on different aspects of the energy situation in the world and related issues like climate change and different policies in that context. Lectures and exercises on the construction of an energy system and use of some tools for the evaluation of the energy system.

Course literature

Information will be given at the course start.

Equipment

Courses in basic energy conversion and basic economics

Examination

- INL1 - Assignment, 2.5 credits, grading scale: P, F
- TEN1 - Examination, 5.0 credits, grading scale: P, 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.

INL1 is composed of one book review and another assignment during the seminar part of the course. The second part of INL1 consists of the preparation of items for discussion during the following seminar as well as to lead the discussion. Attendance is compulsory during the seminar part of the course. The book review can give additional credits that will be added to the credits from the written examination (TEN1), but only for those who have got a P for TEN1.

Other requirements for final grade

Grade P at INL1
Grade P at TEN1

Attendance and active participation in the seminar part

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.