MJ2490 Environomical Path-ways 6.0 credits

Energisystemanalys med exergi-, ekonomi- och miljöperspektiv

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

Establishment

Course syllabus for MJ2490 valid from Autumn 2010

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

MJ1112 Applied Thermodynamics (or equivalent).

Admitted to TMESM.

Language of instruction

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

Intended learning outcomes

After completing the course, the students should be able to:

- Apply a system approach in analyzing the chain for energy conversion, from primary energy source to energy services. This includes:

- To suggest a system boundary for some basic energy conversion problems like sun/moon/geothermal to comfort heating or cooling.
- To conduct an overall analysis of energy, environmental and cost efficiency of an energy conversion scheme.
- To use the result to carry out an environomical discussion, at a basic level, regarding the relationship between energy, environmental and cost effectiveness using the exergy concept as a basis.

- By using project based working method, be able to work with energy systems analysis and environomics in a structured way.

Course contents

This course discusses the basic concept of exergy and efficient energy technologies. It relates the environmental consequences in a life cycle cost (and analyses). The lecturers will highlight the often misunderstood concept of energy “sources”, identifying the presently only “sustainable sources” as the sun, the moon and the geothermal sources in the earth. The focus is on future, sustainable supply chains from primary energy source to energy services in society.

The lectures and exercise classes presents the fundamental tools of exergy analysis, life cycle analysis and environomics, and provide opportunities for problem solving using these tools.

The project covers a deepend discussion of Environomics from the perspective of specific cases, and thus gives the students the opportunity to practical implementation of the tools mentioned above.

Disposition

Lectures, Exercises and Project

Course literature

Thermal Design and Optimization (författare: Bejan, Tsatsaronis, Moran, Wiley 1995, ISBN 0-471-58467-3)

Fransson, T.H., et al., 2009, "Computerized Educational Program", KTH, Energiteknik -- Kraft- och värmeteknologi

Lecture Handouts

Examination

- PRO1 - Project, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- TEN1 - 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

Written exam (TEN1), 3 ECTS, (A-F grading)

Project work (PRO1), 3 ECTS, (A-F grading)

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.