MJ1402 Introduction to Energy Technology 3.0 credits

Energiteknik, introduktionskurs

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

Establishment

Course syllabus for MJ1402 valid from Autumn 2019

Grading scale

P, F

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Basic knowledge in mathematics, thermodynamics, fluid mechanics and heat transfer

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 students should be able to:

- describe and analyse the relation between energy use, the gross national product, GDP, and ”Human Development Index”, HDI values
- describe and analyse the occurrence of multiple aims, multiple stakeholders and an abundance of technical solutions concerning energy systems
- describe and analyse different tools for energy systems including the concept sustainable development, a systems view on energy, and economy tools for evaluation of energy systems
- describe and analyse climate changes and availability of fossil fuels
- describe and analyse different technologies to generate energy in stationary applications, including combustion of fossil fuels, carbon dioxide storage, nuclear power, solar energy, bioenergy and wind power
- describe and analyse energy transformation for use in transport systems

Course contents

The aim of the course is to give students basic knowledge of central energy technologies. This includes how the systems function, how they can be evaluated quantitatively, what they cost and what is their benefits for or effects on the natural environment. A secondary aim is to give the students an overview of the contexts in which these systems are used and developed today and in the future.

The focus of the course lies on presentation of course literature during seminars and it includes tools to understand energy systems, a discussion about sustainable development, climate changes and accessibility for fossil fuels, as well as a number of techniques to generate energy in stationary applications, including combustion of fossil fuels, carbon dioxide storage, nuclear power, solar energy, wind power and energy transformation for use in transport systems.

Course literature

Energy Systems Engineering: Evaluation and Implementation by Francis Vanek, Louis Albright, and Lars Angenent (Publisher: McGraw-Hill, New York).

Lectures in Thermodynamics, fluid mechanics are based on “ Fundamentals of Thermal-Fluid Sciences, 4/e, Yunus A. Çengel, University of Nevada – Reno, John M. Cimbala, The Pennsylvania State University, Robert H. Turner, University of Nevada – Reno. Lectures in heat transfer are based on “Short notes on Heat Transfer, by Björn Palm”.

Examination

- PRO1 - Project, 3.0 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.

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

Requirements for final grade

Pass
1) Presentation of a subject during seminars
2) Subject field report
3) Attendance at seminars
4) Examination of another report

Outcomes-based grading
To pass the course, the student should be able to describe and analyse one of 6 learning objectives and have knowledge of the remaining learning objectives.

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.