MJ2526 Renewable Energy Technology 5.0 credits

Förnybar energi

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

The official course syllabus is valid from the fall semester 2024 in accordance with the decision by the Head of the ITM School: M-2023-2163. Date of decision: 2023-10-13

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

Master of Science in Engineering/engineer with Degree of Bachelor/3-year engineering degree or equivalent education and prior knowledge equivalent to MJ1112 Thermodynamics 9 credits or the equivalent. At least 5 higher education credits thermodynamics.
English B or the equivalent knowledge.

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. Analyse the properties of renewable energy sources and compare these with fossil fuels
2. Identify and quantify methods for the utilisation of renewable energy sources considering basic energy conversion
3. Design renewable energy systems that meet specific energy requirements while being sustainable
4. Identify and discuss strategies around technical solutions for renewable energy

Course contents

The aim of this course is to give a technical assessment of the most important renewable energy resources and associated technology to utilise them from simple methods to ultra-modern advanced energy systems. Apart from a short overview of basic concepts for energy conversion and perspective on energy supply and demand, the five the main subjects include the following:
Solar: solar cells and solar heating
Biomass: resources, biofuels and biochemical transformation
Wind power: primary mechanical design and system aspect
Hydroelectric power: key components technical designs of large-scale and small-scale systems
Energy storage: important components and system concepts for electric and thermal storage

A continuous learning philosophy is applied in this course with an emphasis on problem-solving through application of basic mechanical engineering (energy balances, fluid mechanics and thermodynamics). The course is an integrated part of specialisations in the MSc programme in Sustainable Energy Engineering.

Examination

- HEM1 - Home assignment, 0.4 credits, grading scale: P, F
- HEM2 - Home assignment, 0.4 credits, grading scale: P, F
- HEM3 - Home assignment, 0.4 credits, grading scale: P, F
- HEM4 - Home assignment, 0.4 credits, grading scale: P, F
- HEM5 - Home assignment, 0.4 credits, grading scale: P, F
- KONA - Partial exam, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- KONB - Partial exam, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- SEM1 - Seminars, 1.0 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.

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.