MJ2411 Renewable Energy Technology 6.0 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

On 15/10/2021, the Dean of the ITM school has decided to establish this official course syllabus to apply from autumn term 2022 (registration number M-2021-2040)

Grading scale

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

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

B.Sc. in Engineering with prerequisite in MJ1112 Thermodynamics 9 ECTS or corresponding knowledge. Minimum 5 ECTS thermodynamics.

English B or equivalent.

Language of instruction

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

Intended learning outcomes

Upon successful completion of the course, the student will be able to:

1. Analyze the characteristics of renewable energy sources, and contrast these with fossil fuels
2. Identify and quantify the means of harnessing renewable energy sources in terms of fundamental energy conversion
3. Design renewable energy systems that meet specific energy demands and are sustainable

Course contents

The purpose of this course is to provide an engineering assessment of the most important renewable energy resources and the related technologies for harnessing them, from simple methods to state-of the-art advanced energy systems. Aside from a brief overview of fundamental concepts of energy conversion and perspectives on energy supply and demand, the five main course topics include the following:

Solar: photovoltaics and solar thermal
Biomass: resources, biofuels, and biochemical conversion
Wind power: primary mechanical design and system aspects
Hydropower: key components technical designs of large-scale and small-scale systems
Energy storage: key components and system concepts of electrical and thermal storage

A continuous learning philosophy is adopted in this course, with emphasis on problem solving through application of mechanical and electrical engineering fundamentals; energy balances, fluid mechanics, and thermodynamics (to cover for PV, and other wind power aspects – equivalent circuits). The course is an integral part of specializations within the Sustainable Energy Engineering MSc Program.

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
- KON3 - Partial exam, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- KON4 - Partial exam, 1.0 credits, grading scale: A, B, C, D, E, FX, F
- PROA - Project, 1.0 credits, grading scale: P, 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.

Final grade determined as weighted average of KONA and KONB

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.