MJ2532 Energy Storage - Systems and Applications 5.0 credits

Energilagring - system och tillämpningar

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

Establishment

The official course syllabus is valid from the spring semester 2025 in accordance with the decision by the Head of the ITM School: M-2023-2131. 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

Degree of Bachelor (BSc) or the equivalent

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. Estimate the need of energy storage in a closed system, suggest suitable methods and technologies for energy storage solutions and carry out calculations on such systems.
2. Identify techniques and materials for energy storage and their typical application fields and advantages and disadvantages or limitations.
3. Figure out development needs, potential improvements, innovation possibilities.
4. Assess promising integration aspects between different energy storage solutions together with different power stations in hybrid energy transformation systems
5. Carry out techno-economic calculations of energy storage solutions separately or in connection with their integration with power producers in the energy system.

Course contents

This course gives basic knowledge about the principles and the application of proven techniques and methods for energy storage and the refinement trends for this whole subject area. The need of such a profiled course is large, especially regarding condensed knowledge and specific understanding of the important role that energy storage is expected to play in our future energy systems. The course is a supplement to and a direct continuation of already studied courses about energy resources and energy technology where an extended view on energy storage together with material technology and material production is also needed.

The technological aspect involves knowledge from the subject areas of mechanical engineering, thermodynamics, chemical engineering and electrical engineering, with an emphasis on the synergy between them and on the role that the different methods for energy storage combined can play in innovative energy systems of the future.

Examination

- TEN1 - Written examination, 2.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVN1 - Exercise, 1.5 credits, grading scale: P, F
- ÖVN2 - Exercise, 1.5 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.

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.