



MJ1221 Electricity Supply Systems and Energy Storage 7.5 credits

Elkraftsystem och Energilagring

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

Establishment

The official course syllabus is valid from the autumn 2026 as decided by the Faculty Board decision HS-2025-0013. Date of decision: 2025-10-08

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

none

Intended learning outcomes

Upon completion of the course, students should be able to:

1. Identify and evaluate components and overall performance of power plant facilities.
2. Identify and propose solutions to practical problems regarding power exchange and efficiency for integrated electricity production systems.
3. Calculate energy and power requirements for energy storage systems, from individual units up to large-scale electricity production systems, including virtual power plants.
4. Explain the structure and describe the design of electrical networks with their necessary control parameters and monitoring routines for balancing and optimization.

Course contents

This course builds upon knowledge in applied thermodynamics, heat transfer, fluid mechanics, and electrical engineering. Emphasis is placed on energy conversion processes and technological components as building blocks in integrated systems for electricity supply to both industrial production processes and end-users.

The following topics are covered:

1. Overview of proven power plant technology in modern power systems of both conventional and renewable energy type, with their auxiliary components.
2. Integration between conventional and renewable energy sources.
3. Electrical grids and electricity distribution systems concepts and challenges.
4. Necessity for and technological types of energy storage at system level.
5. Principles and methods for control and optimization of electrical grids.

Examination

- INL1 - Assignment, 1.0 credits, grading scale: P, F
- INL2 - Assignment, 1.0 credits, grading scale: P, F
- ÖVN1 - Exercise, 1.0 credits, grading scale: P, F
- ÖVN2 - Exercise, 1.0 credits, grading scale: P, F
- TEN1 - Written exam, 3.5 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.

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.