EI2460 Batteries for Energy Storage in Electrical Systems 6.0 credits

Batterier för energilagring i elsystem

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

Establishment

The official course syllabus is valid from the autumn semester 2022 in accordance with Head of School decision: J-2021-1968.Decision date: 14/10/2021

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Knowledge in analysis of electric power system, 6 higher education credits, equivalent to completed course EG2100.

Knowledge in Electric Power Systems, 6 higher education credits, equivalent completed course EJ2301.

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:

• account for different technologies for energy storage that can be used in the electrical power system

• account for batteries' life cycle in electrical power system applications

• derive and use models for batteries in the context of electrical power systems

• dimension and analyse battery energy storage systems for different applications in the context of electrical power system

• retrieve models for how storing energy in batteries influences the electricity market and the frequency control in the electrical power system.

• simulate and analyse the influence of a battery energy storage system in a electrical power system.

Course contents

• Different technologies for energy storage

• Planning, operation and maintenance of electric power system with battery energy storage This includes different aspects such as effects on the electricity market, frequency control, charging and distributed systems.

• Electrochemical and thermal models for the calculation of the basic properties of batteries.

• Theory of Ragone plots.

• Cost-benefit analysis for electrical power systems having battery energy storage.

• Modelling and analysis of battery systems with applications to electrical power systems

• Dimensioning and analysis of battery energy storage systems for different applications in electric power grids and transport systems

• Battery storages for energy and transport systems which include cooperation between energy and transport systems through electrification

Examination

- LABA - Laboratory work, 1.0 credits, grading scale: P, F
- INLA - Assignment, 1.0 credits, grading scale: P, F
- TENA - Written exam, 4.0 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.