EJ2400 Electric Traction 6.0 credits

Elektrisk traktion

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

Establishment

The official course syllabus is valid from the spring semester 2026 as decided by the Faculty Board: HS-2026-0392. Decision date: 2026-05-19.

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

Degree of Bachelor (180 credits) or the equivalent. Documented skills in English equivalent English B/English 6.

Intended learning outcomes

Students should after course can:

- account for fundamental issues in electric railway traction including runninig resistance, tractive effort, adhesion, power and energy consumption,
- calculate tractive effort, power, acceleration and velocity of rail vehicles,
- describe the components in electric drives with induction motors and dc motors,
- make estimations of voltages, currents and power in the electric drives for rail vehicles with induction motors and dc motors,
- be familiar with other types of electric drives for rail vehicles,
- describe the design of ac and dc power supplies for electric traction,
- calculate the power capacity for different railway power supply systems,
- describe the background of electromagnetic interferences (EMI) in electric railway traction and give an account of important concepts and parameters.

Course contents

Historical overview. General principles of electric traction and in particular electric railway systems. Tractive and braking effort. Power requirements and energy consumption. Traction vehicles; electric drives, transformers and converters, control and mechanical transmission. Power supply systems; ac and dc supplies. Power capacity, overhead catenary systems, overvoltages, line interference and electromagnetic compability, EMC.

Examination

- TEN2 - Home assignments and written exam, 6.0 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.

Transitional regulations

All earlier test parts are now included in TEN2.

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.