



# EJ1200 Electric Power Systems

## 6.0 credits

Eleffektsystem

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 the decision from the head of school: J-2022-0273. Decision date: 2022-03-09.

### Grading scale

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

### Education cycle

First cycle

### Main field of study

Electrical Engineering, Technology

### Specific prerequisites

Knowledge in electrical circuit analysis, 6 higher education credits, equivalent completed course EI1110 or EI1120.

Active participation in a course offering where the final examination is not yet reported in LADOK is considered equivalent to completion of the course. Being registered for a course counts as active participation. The term 'final examination' encompasses both the regular examination and the first re-examination.

# 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 shall be able to

- describe the meaning of active, reactive and apparent power
- describe/explain concepts as amp-turn, flux density, flow, inductance, reluctance and magnetic energy, and carry out calculations on simple magnetic circuits
- calculate magnetic forces by means of the force law and virtual work
- describe the function of the transformer transmission lines, the synchronous machine, the bridge-connected DC-DC voltage converter, the voltage source inverter and the components of an electric drive system
- analyse three-phase systems by means of single-phase equivalent circuits, phasor diagrams, the complex method and calculate mean values, peak levels and RMS values and for simple waveforms also fundamental value and harmonics
- describe different types of nodes in an electric power system and calculate power flows in an electric power system consisting of lines and loads.

## Course contents

Basic concepts and problems.

Single-phase and three-phase electric circuits.

Magnetic circuits. Single-phase and three-phase transformers.

Magnetic forces. The synchronous machine.

Power electronics. Fourier analysis of currents and voltages in electric power systems. The bridge-connected DC-DC voltage converter. Single-phase and three-phase power electronic inverters.

Transmission line models. Transfer of power.

Electrical drives.

## Examination

- LABD - Laboratory work, 0.5 credits, grading scale: P, F
- LABE - Laboratory work, 0.5 credits, grading scale: P, F

- LABF - Laboratory work, 0.5 credits, grading scale: P, F
- TEN2 - Written exam, 4.5 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.