EJ1200 Electric Power Systems 6.0 credits

Eleffektsystem

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

Establishment

Course syllabus for EJ1200 valid from Autumn 2007

Grading scale

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

Education cycle

First cycle

Main field of study

Electrical Engineering, Technology

Specific prerequisites

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

When the student has passed the course, the student should:

- know active, reactive and apparent power.

- be able to calculate mean values, peak values, rms-values, and harmonics.

- be able to analyse three phase systems using single phase equivalent circuits, phasor diagrams, and jw-method.

- be able to describe different nodes in a power system.

- be able to calculate transmission of power in power systems.

- be able to do calculations on magnetic circuits.

- be able to calculate magnetic forces by using the law of magnetic force, virtual work, and Maxwell's tensions.

- describe rotating magnetic fields, and describe three-phase systems by using the vector-method.

- describe the function of the transformer, transmission lines, synchronous machine, one- and three-phase power electronic converters, and vector controlled synchronous machine.

- by using the jw-method, equivalent circuits and phasor diagrams, be able to analyse transformer, transmission lines, synchronous machine, one- and three-phase power electronic converters, and vector controlled synchronous machine.

- know which tasks that can be solved by using power electronic converters in the power system.

Course contents

Fundamental concepts and problem areas. Single-phase and three-phase power.

Transmission line models. Transmission of power. Ferro-magnetic circuits.

The transformer. Magnetic forces. Vector representation of three-phase systems.

The permanent magnet synchronous machine. Single-phase and three-phase power electronic inverters. The output voltage vector of an inverter. Vector control of permanent magnet synchronous motors. Applications: wind power plants interacting with the utility grid, hybrid electric vehicles, servo systems for industrial robots, power electronics in the grid.

Examination

- TENA - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 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.

Other requirements for final grade

Laboration (LAB1, 1,5 cr)
Written examination (TENA1, 1,5 cr)

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.