



# EJ2301 Power Electronics 6.0 credits

Effektelektronik

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

## Establishment

Course syllabus for EJ2301 valid from Autumn 2014

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## Specific prerequisites

English B or equivalent.

## Language of instruction

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

## Intended learning outcomes

Aim of the course is to give the students tools to be able to analyse and understand the main circuits that are used for power electronic converters.

After completed course the student should be able to

- describe the operating principle for a general power converter by using the basic equations for an inductor and capacitor.
- calculate important measures like average value of output voltage and fundamental content of line current.
- explain different operating conditions.
- outline the control of power converters.
- describe modern power semiconductors, their control and protection.
- dimension and analyze a simple converter both electrically and thermally.

## Course contents

Electricity plays a vital role in supplying energy to computers, electronics, industrial processes, trains and many other applications. They all have in common that the electrical energy has to be converted and controlled in a precise manner. This course provides in depth knowledge of power converter topologies, their characteristics and principles for their control. The course also covers the basics of modern power semiconductors.

## Disposition

Lectures 28 h

Exercises 20 h

Web task 10 h

Seminars 10 h

Laboratory class 2x4 h

Project 15 h

## Course literature

Mohan/Undeland/Robbins: Power Electronics: Converters, Applications, and Design, John Wiley & Sons

## Examination

- SEM1 - Peer Assessment, 0.5 credits, grading scale: P, F

- PRO1 - Project Work, 1.0 credits, grading scale: P, F
- TEN1 - Written Exam, 3.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Class, 0.5 credits, grading scale: P, F
- XUP1 - Web-based Module, 0.5 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

Written examination (TEN1)

Laboratory class (LAB1)

Project report (PRO1)

Peer assessment (SEM1)

Web-based examination (XUP1)

The final grade for the course is based on the written examination but bonus points can be obtained from LAB1, PRO1, SEM1 and the exercises.

## 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.