



# EL2450 Hybrid and Embedded Control Systems 7.5 credits

Hybrida och inbyggda reglersystem

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

If the course is discontinued, students may request to be examined during the following two academic years

## Establishment

Course syllabus for EL2450 valid from Spring 2010

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

Electrical Engineering

## Specific prerequisites

For single course students: 120 credits and documented proficiency in 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

After the course the student should be able to describe and explain analysis- and design methods for embedded and network based control systems.

In particular, the student shall be able to:

- Translate analogue controllers into digital implementations, and propose computer code for the implementations.
- Analyze basic properties (such as stability, controllability, observability etc) for sampled systems.
- Analyze limitations in embedded control systems, such as quantization and communication limitations.
- Perform simple dynamic modelling of real time systems.
- Motivate hybrid systems as a general modelling tool for embedded systems.
- Analyze dynamic properties of hybrid systems.
- Verify design specifications in hybrid systems.
- Account for applications of the course content within several technical areas.

## Course contents

Time triggered control, modelling and analysis of sampled systems, computer implementation of control systems, properties and limitations of implementation platforms, event triggered control, real time operating systems, scheduling, computational modelling, hybrid control: models, dynamic properties, verification.

## Course literature

Lecture notes and handout material; see the course homepage.

## Examination

- LAB1 - Assignment, 0.5 credits, grading scale: P, F
- LAB2 - Assignment, 0.5 credits, grading scale: P, F
- LAB3 - Assignment, 0.5 credits, grading scale: P, F
- TEN1 - Examination, 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.

## Other requirements for final grade

TEN 6 cr, LAB1 0.5 cr, LAB2 0.5 cr, LAB3 0.5 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.