



# EL2450 Hybrid and Embedded Control Systems 7.5 credits

## Hybrida och inbyggda reglersystem

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Course syllabus for EL2450 valid from Spring 10

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

**Grading scale:** A, B, C, D, E, FX, F

**Education cycle:** Second cycle

**Main field of study:** Electrical Engineering

### 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 main content

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.

### Language of instruction

Language of instruction is specified in the course offering information in the course and programme directory.

### Eligibility

For single course students: 120 credits and documented proficiency in English B or equivalent.

### 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

## **Requirements for final grade**

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