



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

On 06/16/2021, the Head of the EECS School has decided to establish this official course syllabus to apply from spring semester 2021, registration number J-2020-1806.

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

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 should be able to

- formulate basic theory and definitions of important concepts in hybrid and embedded control systems
- apply theory and methods in hybrid and embedded control systems.

Course contents

The course covers time-controlled, event driven and hybrid control. Time-controlled regulation: modelling and analysis of sampled systems, computer implementation of control systems, properties and limitations of implementation platforms. Event-driven control real time operating systems, scheduling, modeling of computations. Hybrid control: models, dynamic properties, verification. In particular, the following is treated

- Digital implementation of analogue controllers, computer coding for implementation
- Analysis of basic properties, such as stability, controllability, observability for sampled systems
- Analysis of limitations of embedded control systems, such as quantisation and communication limitations.
- Analysis of basic properties of event-driven control systems
- Simple dynamic modelling of real time systems
- Motivate hybrid systems as a general modeling tool for embedded systems
- Analysis of dynamic properties of hybrid systems
- Verification of design specifications for a hybrid system
- Application of the course content in several fields of engineering.

Examination

- HWK1 - Homework, 0.5 credits, grading scale: P, F
- HWK2 - Homework, 0.5 credits, grading scale: P, F
- HWK3 - Homework, 1.0 credits, grading scale: P, F
- TENA - Examination, 5.5 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.

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.