FIL3603 Low Power Analog and Mixed-Signal ICs 7.5 credits

Lågeffekts analog och mixed signal IC

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

Establishment

The official course syllabus is valid from the autumn semester 2025 as decided by the Faculty Board: PA-2025-0013. Date of decision: 2025-10-07.

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

A course in analog electronics is required. Knowledge of electronics devices and analog circuits, Laplace and z-transforms, and frequency-domain circuit analysis is required. Familiarity with SPICE is required.

Intended learning outcomes

The aim of this course is to provide an understanding of, and experience with, the concepts, analysis and design of low voltage low power analog and mixed signal integrated circuits in CMOS technology. After this course the students should be able to:

- Explain the basic design concepts for low power mixed signal VLSI circuit in CMOS technology.

- Apply the knowledge in low-power analog and mixed-signal VLSI circuit analysis and simulation.
- Identify the critical parameters that affect the analog and mixed-signal VLSI circuits performance.
- Design low-power analog and mixed-signal VLSI circuits by using CMOS processes.

Course contents

Through this course the students can perform studies that cover:

Device and noise, CMOS opamps and current mirrors, voltage comparators, sample/hold circuits, bandgap voltage references, switched-capacitor (SC) circuits, continuous-time (CT) circuits, Nyquist and oversampling DACs, Nyquist and oversampling ADCs.

Examination

- EXA1 - Examination, 7.5 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.

Grading scale: P/F

Other requirements for final grade

Homeworks and final exam.

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.